Application for Operating Permit

For

Pioneer Gulch Placer Mining Project, Powell County, MT

Prepared for:

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September 2012

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1.0 INTRODUCTION

Golden Rule Placer Mining Inc., (Golden Rule) proposes to enter into a new phase of mining activity on its Pioneer Gulch Property by excavating placer gravels from an expanded South Pit mining operation and proposes to reprocess historic placer spoils located at the current ore-processing area. Expected mine life in the South Pit and reprocessing area is expected by be a minimum of 5-years. Golden Rule currently conducts operations under two Small Miner's Exclusion Statements reviewed and bonded by the Montana Department of Environmental Quality (DEQ). Golden Rule previously submitted applications for and received Exploration Licenses 28-111 and 28-111B to excavate exploratory trenches in Pioneer and Squaw Gulches to further assess these deposits by acquiring a bulk sample of placer gravels for processing (Golden Rule, 2011).

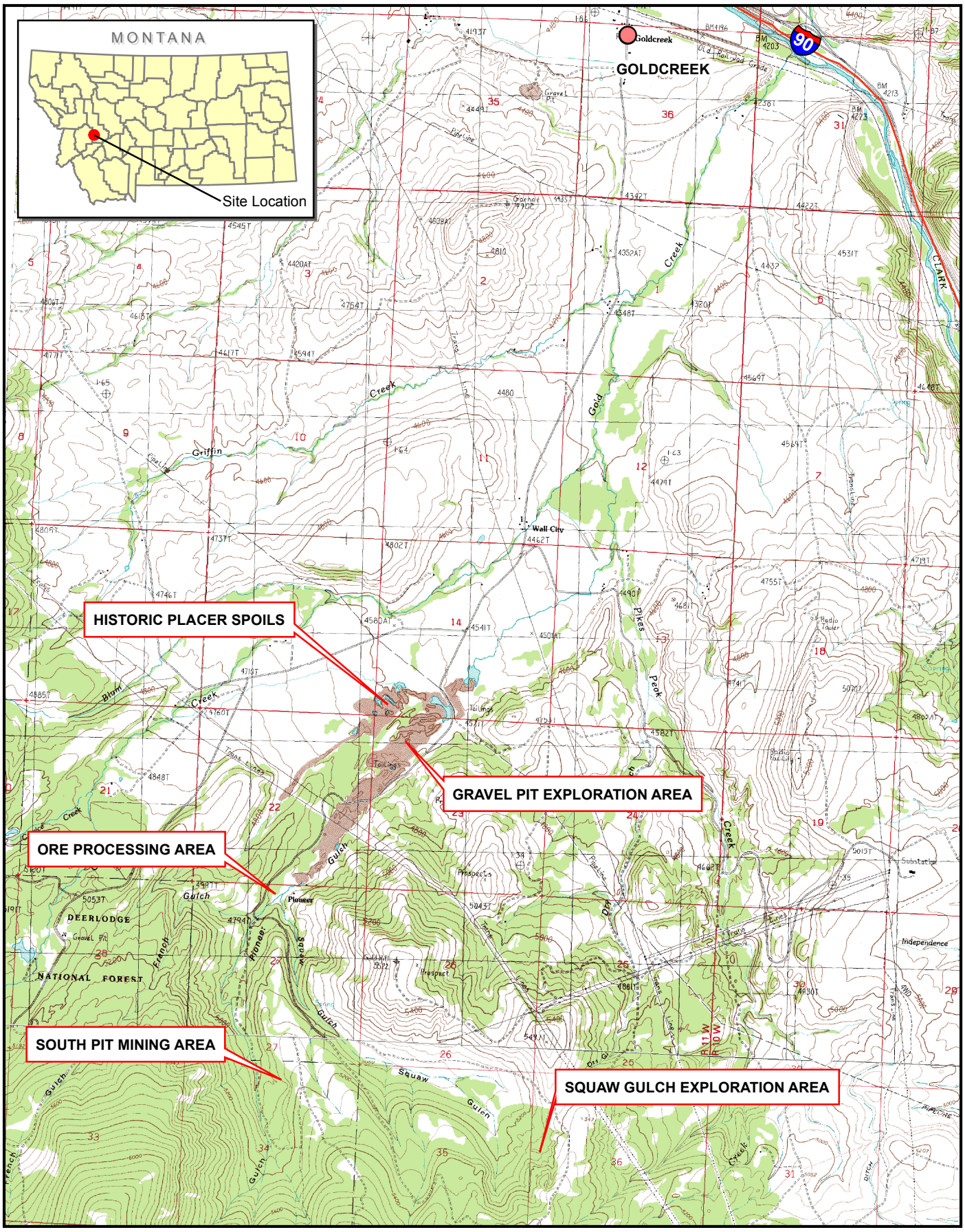
This document is an application for a Mine Operating Permit to increase the scale of operations to an extent that would exceed the disturbance acreage allowed under the Small Miner's Exclusion Statements. Specifically, Golden Rule proposes to establish two permit areas, one 43-acre area encompassing the South Pit Mining Area and a second 17-acre permit area encompassing the ore-processing area. An estimated total of 25.5 acres would be disturbed during the next 5 years of mine operations although concurrent reclamation within the South Pit Mining Area would result in no more than 6 acres of non-reclaimed disturbance at any given time.

1.1 Project Location

The Golden Rule Pioneer Gulch Project area is located at the northern terminus of the Flint Creek Range about 5 miles south of Gold Creek and 9 miles west of the town of Garrison in Powell County, Montana (**Figure 1**). The property is accessed from Interstate 90 about 9 miles northwest of Garrison at exit 166 (Gold Creek) then by travelling south about 5 miles on County Road 248, and then about 2 miles southwest on County Road 20. The nearest larger town is Deer Lodge located about 15 miles to the southeast. Deer Lodge is the county seat of Powell County with about 3,400 residents.

Golden Rule placer mining and processing operations are located at an elevation of about 4,700 feet in sections 22, 27, and 34, T 9 N, R 11 W. The land is privately owned (Don Beck) ranch land held in a limited liability company called Beck Gold Creek Ranch, LLC (**Figure 2**). The private landowner owns both surface and mineral rights on his private land including in the South Pit Mining Area and has a legal right to mine this area as permitted under the General Mining Act of 1872. Golden Rule Placer Mining, Inc. has an underlying agreement in place with the ranch owner to placer mine gold on his property. The changes proposed in this Application for an Operating Permit would expand operations onto land located in Pioneer Gulch. This land is also held by the Beck Gold Creek Ranch, LLC. Inlying tracts of BLM land (**Figure 2**) have been staked with mining claims by various entities or individuals related to the Beck ranch. None of Golden Rule's proposed operations occur on these inlying BLM tracts.

A review of surface and groundwater rights in the area identified only one statement of claim on file within one mile upstream or downstream of the proposed processing area. This claim is in the name of Beck Gold Creek Ranch, LLC with a priority date of 1890 for the amount of 2.5 cubic feet per second. There is no continuous surface water flow between the ore-processing facility and the nearest downstream water right due to historic disturbances related to placer gold dredging operations.



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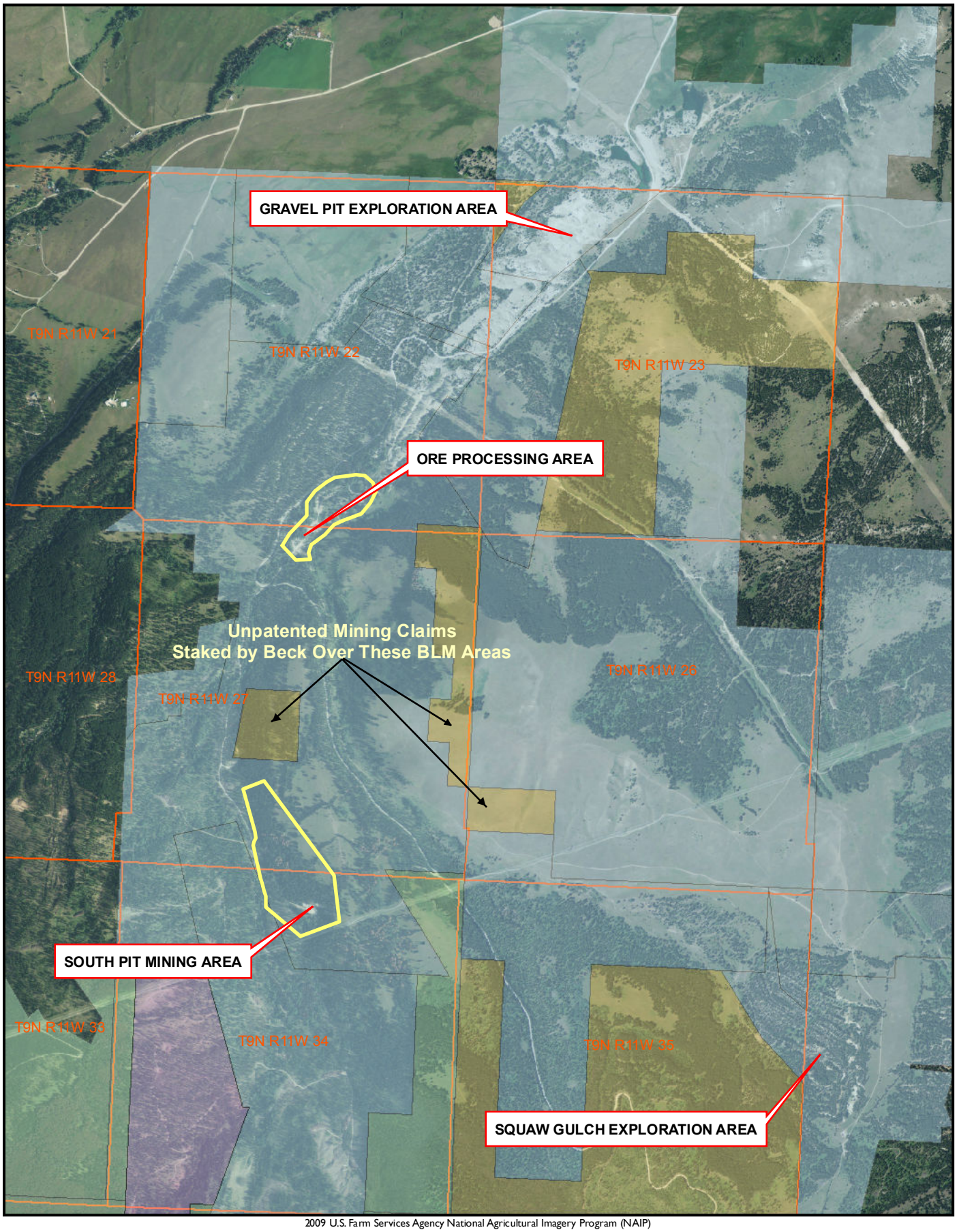
USGS 100K SERIES TOPOGRAPHIC MAP

Location Map
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 1



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2009 U.S. Farm Services Agency National Agricultural Imagery Program (NAIP)

N
W E
S

0 500 1,000 2,000 Feet

- BECK DONALD R
- BECK GOLD CREEK RANCH LLC
- BUREAU OF LAND MANAGEMENT
- USDA FOREST SERVICE
- Proposed Permit Boundary

Land Status Map
Pioneer Placer Field
Golden Rule Placer Mining Inc.
Gold Creek, Montana
FIGURE 2

1.2 Required Basic Project Information for the Application

Company Name:	Golden Rule Placer Mining, Inc.
Address:	PO Box 20878 1445 Broadwater Ave Billings, MT 59104
Contact Person:	Tom Williams (Company Officer)
President:	George Frank (Owner and Majority (95%) Stock Holder)
Phone:	(406) 248-8728
Site Name:	Golden Rule Placer Mining project, Pioneer Gulch
Location:	T 9 N, R 11 W, Sections 22, 27, and 34. See also **Figure 1** and **Figure 2**.
County:	Powell County, Montana

1.3 Geologic Setting

Golden Rule currently mines or proposes to mine in Pioneer Gulch located in the Pioneer mining district on bench-lands between the northern terminus of the Flint Creek Range and the Deer Lodge Valley. Mountains of the Flint Creek Range consist of Mesozoic sedimentary rocks intruded by Tertiary granite and a zone of metamorphic rocks that are marginal to the granite (Pardee, 1951). Lode gold deposits that existed in these mountains were excavated by three successive periods of glacial erosion referred to as the early, intermediate, and late periods. The source gold veins apparently contained less gold at depth and as a result the greatest amount of gold was eroded during the earliest period of glacial activity while lesser amounts became entrained in the glacial materials transported during the intermediate and late glacial erosional periods.

The bench-lands originally consisted of an erosional shelf extending from the mountains toward the interior of the Deer Lodge Valley underlain by Cretaceous sedimentary rock, Tertiary volcanic rock, and lens-shaped “lake beds” comprised of mixed volcanic ash and clay alternating with marl, sand, and gravel (Pardee, 1951). This shelf was capped by Quaternary glacial and fluvial gravels as alluvial fan deposits. During the Tertiary or early Quaternary interglacial periods streams eroded the bench-lands. The erosional features were subsequently filled with gold-bearing glacial outwash material and then reworked by continued stream flow which concentrated the gold into the fluvial channel deposits. Subsequent erosion scoured out portions of the fluvial channels and left the gold–bearing gravels as erosional terraces lateral to the channels. Two later periods of glaciation (i.e. intermediate and late drifts) deposited lesser amounts of gold along with glacial sediments above the relic gold-bearing terraces. Streams cut deeper channels through the bench-lands during the post-Pleistocene epoch to form the current

active stream channels and adjacent terraces that are the focus of and recent historic gold mining activities.

Golden Rule mines gold and silver from the sands and gravels of these erosional remnant valley fill and terrace deposits located about 100 feet above the present day water level in Pioneer Gulch as discussed in Section 2.5.

2.0 EXISTING ENVIRONMENTAL CONDITIONS

Existing environmental conditions in the project area have been evaluated by baseline surveys and monitoring events, and also through review and compilation of data from various online sources. The following sections describe the current understanding of the existing environment in the vicinity of the project area. An increased understanding of the existing environment will be obtained through on-going and operational monitoring programs that are described in Section 3.7.

2.1 Climate

The climate of the project area is typical of uplands in central Montana with moderate summers and severe winters. Climate data are available from the Western Regional Climate Center (2011) for a weather station (Deer Lodge 3 W, 242275) operated near Deer Lodge from 1959 through 2005. Average monthly temperatures at this location ranged from 9°F in January to 80°F in July. The average annual low temperature was 26°F while the average annual high temperature was 56°F. Average annual precipitation was 10.8 inches with an average total snowfall of 36 inches. Average monthly snowpack was 4 inches or less. The climate at the Project Area can be expected to be somewhat cooler and wetter than those reported at the Deer Lodge weather station due its proximal location and northeasterly aspect with respect to the Flint Creek Mountains. National Resource Conservation Service (NRCS) (2011) soil survey data for the area indicates average annual temperatures ranging from 39°F to 45°F with an annual precipitation ranging from 15 to 19 inches per year.

2.2 Air Quality

The project area lies within Airshed 5 of the Montana/Idaho Airshed Group's Airshed Management System and is considered to be in attainment of Federal air quality standards by DEQ (MDEQ, 2012). The nearest areas of non-attainment for PM10 levels are Butte located about 50 miles to the southeast and Missoula located 50 miles northwest. East Helena is also an area of non-attainment for lead and sulfur dioxide located 60 miles east of the project area.

The nearest Class 1 airsheds are located about 60 miles to the west in the Selway-Bitterroot Wilderness west of Victor and Darby and also about 40 miles south in the Anaconda Pintler Wilderness Area.

No air quality monitoring stations are located in the vicinity of Pioneer Gulch. The nearest upwind monitoring stations are located in the Bitterroot Valley near Hamilton and Missoula while the nearest downwind stations are located in Butte.

2.3 Hydrology

Data to assess hydrologic and water quality conditions in the project area are available from various databases and are being augmented with data collected as part of baseline and operational monitoring programs described in Section 3.7. These data are summarized below.

2.3.1 Surface Water

The project area is located between Pioneer Gulch and Squaw Gulch which are tributary streams to Gold Creek (**Figure 1**). Gold Creek flows north out of the Flint Creek Range and joins the Clark Fork River near the town of Gold Creek. Average annual flow rates of about 30

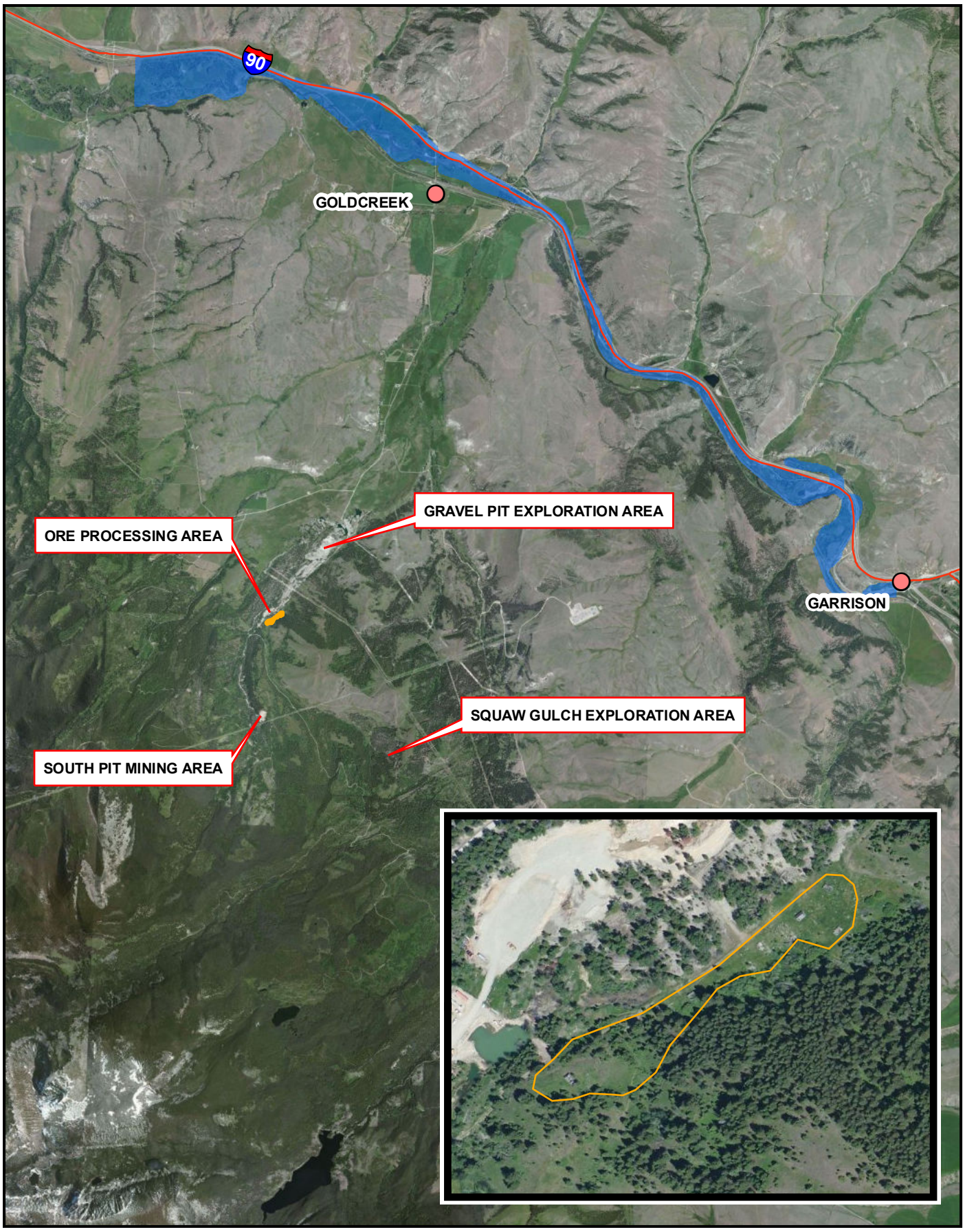
cubic feet per second (cfs) were reported for the USGS gauging station operated on Gold Creek at the town of Gold Greek in 1965 and 1966.

Much of the mine site, particularly in the vicinity of the ore-processing area was disturbed during placer operations in the 1800s. During this period alluvial valley fill materials were mined by dredging near the historic town site of Pioneer (**Figure 1** and **Figure 3**), with stacked dredge tailings piles placed along the creeks. Previous drainage patterns had been sufficiently deranged by mining that surface water was, and presently occurs only in several widely-spaced, discontinuous freshwater dredge ponds down the historic channel of Pioneer Gulch below the ore-processing area (**Figure 4**). In the ore-processing area and for more than one mile downstream, there is no flowing channelized surface water, but instead water moves through the deranged alluvial valley fill material, mine spoils and dredge ponds as groundwater.

The headwaters of Pioneer Gulch and Squaw Gulch Creeks are respectively located to the south and east of the ore-processing area. They converge immediately south (up-gradient) of the processing area and flow into the mine supply water ponds constructed by previous operators at the site (**Figure 4**). Water is pumped from these ponds during trommel operations. Most of this water is captured and re-cycled back to the water supply ponds and some of it is discharged to an infiltration pond located at the northern end of the processing area. During operations, discharge to the infiltration ponds rapidly infiltrates into the historic placer spoils. The nearest down-gradient surface water consists of a series of isolated and scattered freshwater dredge ponds and irrigation ditches located about 1.3 miles to the north of the infiltration pond and processing area (**Figure 4**). During high flow, water moves through a series of shallow braided channels and sheet flow across an agricultural field south of the town of Gold Creek and Old Stage Road. During low flow, water is confined to irrigation ditches and is sometimes completely consumed by agricultural use before converging with Gold Creek (J. Sanchez, Personal Communication September 23, 2011).

Stream flow and surface water quality data are available for Squaw Gulch Creek, the mine infiltration pond, and Pioneer Gulch Creek including two locations in or near the agricultural field down-gradient of the project area (**Table 1** and **Figure 5**). These data were collected in June (high flow) and September (low flow) 2011, and again in May (high flow) and July (moderate flow) of 2012 as part of Golden Rule's baseline water quality monitoring program. It should be noted that mine processing operations were typically not being conducted when samples were collected from the infiltration pond (location SP-3), but operations were active during the July 2012 monitoring event. Samples collected from the infiltration pond when processing operations were not active consisted of residual water contained in the pond or nearby on the process area pad below the processing equipment.

All samples collected in 2011 and 2012 were of good quality with pH values ranging from 7.05 to 8.87 and most constituents present at concentrations below MDEQ required reporting levels (**Appendix A**). The only constituents that exceeded applicable surface water standards in samples collected from the creeks were iron and manganese during one or two monitoring events at stations SG-1 and SG-2 (**Table 2**). Iron and manganese concentrations were also elevated relative to DEQ-7 standards in samples collected from the infiltration pond (SP-3) during three monitoring events. This was especially evident during the July 2012 monitoring event when water discharge from the ore processing circuit was occurring. Despite a total recoverable iron concentration of 39.4 mg/l, the concentration of dissolved iron was below detection (<0.05 mg/l) indicating that increased constituent concentrations are due to transport of suspended sediment which is filtered from the water during percolation into the infiltration pond (**Appendix A**).



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2011 BING MAP SERVICES

N
W E
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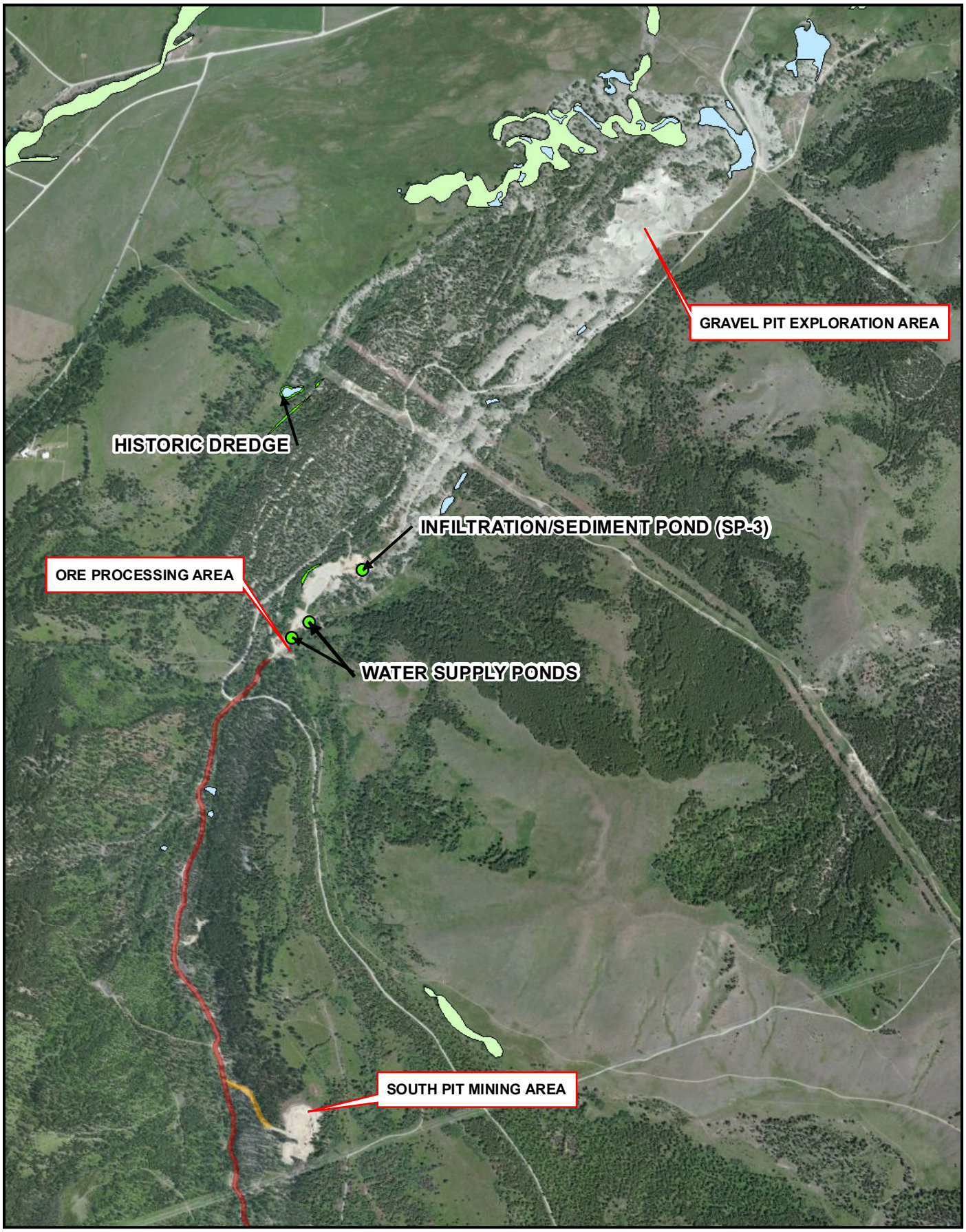
0 4,000 8,000
Feet

100 Yr. Flood Plain (1981)
Historic Pioneer Town Site

Flood Plain Map
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 3



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2009 U.S. Farm Services Agency National Agricultural Imagery Program (NAIP)

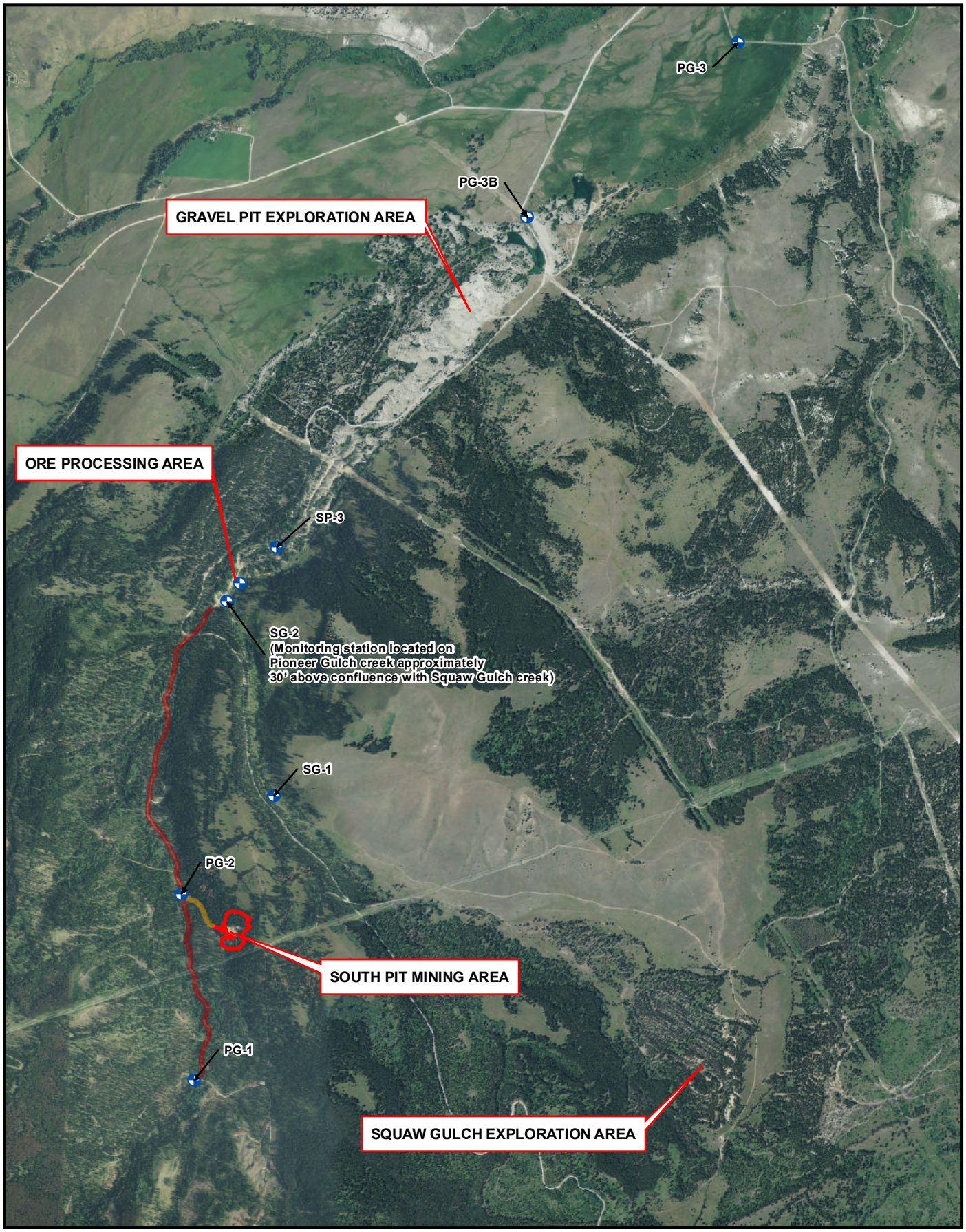
N
W E
S

0 375 750 1,500 Feet

Freshwater Pond
Riparian Forested-Shrub
Potential Wetlands

Access Roads
Existing Pioneer Gulch Road
Rehabilitated South Mining and Exploration Area Access Road

Wetlands Map
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 4



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2009 U.S. Farm Services Agency National Agricultural Imagery Program (NAIP)

N
W E
S

0 550 1,100 2,200 Feet

Surface Water Monitoring Locations
(PG = Pioneer Gulch, SG = Squaw Gulch, SP = Sediment Pond)

Access Roads
Existing Pioneer Gulch Road
Rehabilitated South Mining and Exploration Area Access Road

Surface Water Monitoring Locations
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 5

Table 1. Pioneer Gulch Placer Project Surface Water Monitoring Locations	
Station ID.	Description
Pioneer Gulch Creek	
PG-1	2,200 feet up-gradient of South Pit Mining Area.
PG-2	850 feet down-gradient of South Pit Mining Area.
SG-2	At south end of Process Area, 30 feet above confluence with Squaw Gulch Creek.
PG-3	At north end of agricultural field up-gradient of Old Stage Road. Site was abandoned after September 2011 monitoring event due to lack of water under most conditions.
PG-3B	At south end of agricultural field near northern terminus of historic placer spoils. Nearest observed surface water down-gradient of process area.
Squaw Gulch Creek	
SG-1	Spring at head of Squaw Gulch Creek.
Process Ponds	
SP-3	Sediment/Infiltration pond at down-gradient end of process area.

Constituent concentrations were consistently well below applicable standards and total dissolved solids concentrations were near or below the reporting limit at the next downstream station (PG-3B) during all monitoring events.

While it does not exceed applicable standards, mercury is detected in the upper reach of Pioneer Gulch creek monitored at PG-1 and PG-2 (**Appendix A**). Mercury concentrations at these locations ranged from below detection (<0.005 ug/l) to 0.018 ug/l. The human health standard for mercury is 0.05 ug/l. Mercury has not been detected downstream at SG-2 (immediately above the ore processing area) or at PG-3B (downstream of the ore processing area) although two samples from the SP-3 infiltration pond have contained detectable mercury concentrations (0.007 ug/l and 0.022 ug/l).

2.3.2 Groundwater

There are 35 groundwater wells listed by the Montana Bureau of Mines and Geology's Groundwater Information Center in sections adjacent to the mine (**Figure 6**) (MBMG, 2011). Most of these wells (31) are clustered to the northwest of Pioneer Gulch in sections 15, 16, 21, and 28, and are separated from the mining, ore-processing, and anticipated exploration areas by low ridges that act as surface water, and likely groundwater, divides. These wells are primarily for domestic water supplies although one well is unused and another three are used to provide stock water. Depth to groundwater ranges from 3 feet to 210 feet below ground surface (bgs) and averages 60 feet bgs. The nearest of these wells to the project area (GWIC # 158885) is located about 0.75 miles to the northwest of the ore-processing area and is completed in cobbles and clay at a total depth of 389 feet bgs.

An additional four groundwater wells are located further to the north and east of the ore-processing and mining areas (MBMG, 2011). These wells are more likely within the down gradient groundwater flow path from the mine but are a considerable distance (2.5 miles) away. These domestic wells are shallower (total depths of 40 to 128 feet bgs) than those located west

Table 2. Summary of 2011-2012 Surface Water Quality Data[1]

Location	Date	Flow	Sulfate	TSS	Aluminum	Barium	Iron	Manganese	Strontium	Uranium
		GPM	Total Recoverable Concentrations in mg/L (except for aluminum which is dissolved)							
Standard[2,3]		--	250	--	0.087	2	1	0.05	4.0	0.02
Pioneer Gulch Creek										
PG-1	June 2011	198	7	12	--	<0.1	0.24	0.011	0.1	0.001
	Sept 2011	9	5	33	--	0.051	**1.68**	0.111	0.2	0.0016
	May 2012	23.8	6	32	<0.03	0.039	0.51	0.034	0.2	0.0017
	July 2012	3.1	5	51	<0.03	NM	0.69	0.035	0.1	0.0015
PG-2	June 2011	378	6	<10	--	<0.1	0.18	<0.003	0.2	0.001
	Sept 2011	23	6	<10	--	0.046	0.13	<0.005	0.2	0.0015
	May 2012	126	6	<10	<0.03	0.038	0.05	<0.005	0.2	0.0016
	July 2012	30	6	50	<0.03	NM	0.13	0.015	--	0.0016
SG-2	June 2011	375	12	77	**--**	<0.1	**3.66**	**0.085**	0.2	0.002
	Sept 2011	152	12	<10	--	0.032	0.14	0.012	0.2	0.0035
	May 2012	320.3	17	<10	<0.03	0.029	0.17	0.021	0.2	0.0030
	July 2012	70.3	12	<10	<0.03	NM	0.28	**0.056**	--	0.0032
PG-3	June 2011	--	17	<10	--	<0.1	0.14	0.008	0.2	0.001
PG-3B	Sept 2011	450	40	<10	--	0.034	<0.05	<0.005	0.3	0.0023
	May 2012	4016.5	26	<10	<0.03	0.026	<0.05	<0.005	0.2	0.0013
	July 2012	1628.5	29	16	<0.03	NM	<0.05	<0.005	--	0.0014
Squaw Gulch Creek										
SG-1	June 2011	--	8	<10	--	<0.1	0.03	<0.003	0.3	0.006
	Sept 2011	186	9	<10	--	0.042	0.22	<0.005	0.3	0.0063
	May 2012	70.8	9	13	<0.03	0.039	0.05	0.005	0.3	0.0063
	July 2012	62.5	9	20	<0.03	NM	0.17	0.024	0.3	0.0069
Process Ponds										
SP-3	June 2011	<5	26	119	**--**	0.1	**6.56**	**0.429**	0.3	0.002
	Sept 2011	0	16	<10	--	0.032	<0.05	<0.005	0.2	0.0051
	May 2012	--	32	<10	<0.03	0.044	0.23	**0.290**	0.3	0.0047
	July 2012	400	12	651	<0.03	0	**39.4**	**1.16**	--	0.0057

[1] Only aluminum and metals detected in 50% or more samples are reported. See Appendix A for complete dataset.

[2] 2010 DEQ-7 chronic aquatic life standards for aluminum and iron. Other standards are lowest applicable; barium (human health), manganese (secondary), strontium, (groundwater), sulfate (EPA standard), and uranium (human health). Hardness dependent standards calculated for 150 mg/L hardness.

[3] Surface water standard for aluminum applies to dissolved fraction (not measured in 2011 samples).

TSS = Total Suspended Solids

-- = Parameter not measured.

Bold values exceed applicable standard.

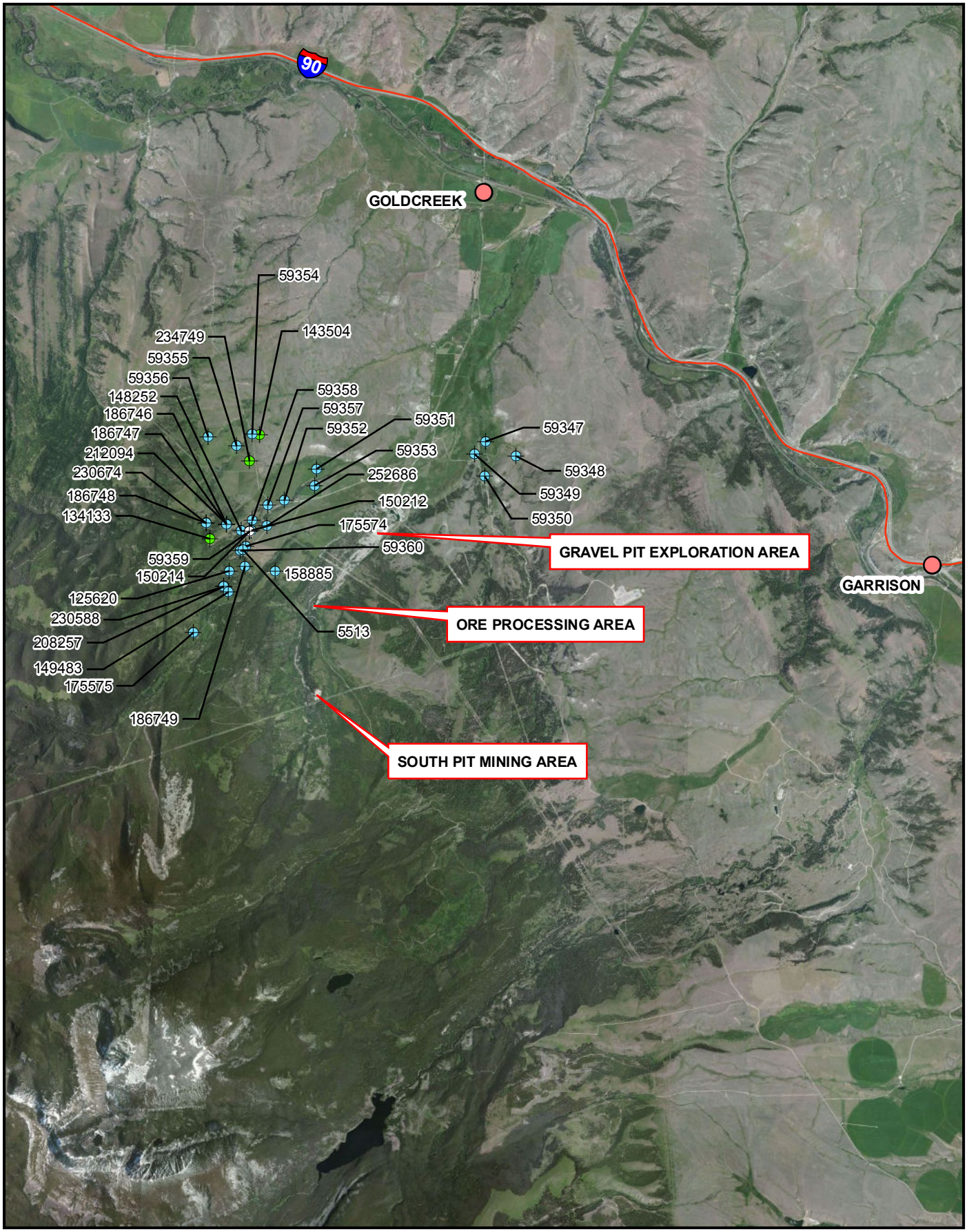
of the mine due to their location closer to the valley bottom. Depth to groundwater ranges from 21 to 95 feet bgs and averages 46 feet bgs.

Water quality data are available for two wells; GWIC ID# 5513 located west of the mine in section 21, and GWIC ID# 59354 located about 1.5 miles due north of well 5513 16. No data are available for wells to the northeast of the mine. Well # 5513 was sampled November, 1985 while well # 59354 was sampled in November, 2001. Analytical data for these wells are provided in **Appendix B** and are summarized below (**Table 3**). Water sampled from well # 5513, located in the foothills of the Flint Creek range was of good quality, met drinking water standards for all measured constituents, and had a low sulfate concentration (17.8 mg/L). Water sampled from well # 59354 met drinking water standards for all measured constituents except for sulfate and radon. This well had a high concentration of total dissolved solids (1,399 mg/L).

Table 3. Summary Groundwater Quality Data[1]

GWIC ID	Total Depth	Arsenic	Barium	Iron	Strontium	Sulfate	TDS	Zinc	Radon
	Feet bgs	Dissolved Concentrations in mg/L							pC/L
Standard[2]	--	0.01	2.0	0.30	4	250	--	2.0	300
5513	77	0.0003	0.030	<0.002	0.160	17.8	155.9	0.015	--
59354	60	<0.001	0.042	0.0032	1.09	**856**	1,399	0.008	**750**

[1] See Appendix B for complete dataset. All measured exceedances of DEQ-7 standards are reported in this table.
[2] 2010 DEQ-7 drinking water standards except for sulfate which is secondary maximum contaminant level.
TDS = Total Dissolved Solids
-- = Parameter not measured or no drinking water standard exists.
Bold values exceed applicable standard.



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N
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0 0.5 1 2
Miles

USGS 100K SERIES TOPOGRAPHIC MAP

- Domestic
- Stockwater
- Unused

59354 GWIC Identification Number

Groundwater Well Map
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 6

2.4 Stream Sediment

No records have been identified indicating whether mercury was used during historic mine operations. Because of the potential for its historic use, and because low levels of mercury are detected at surface water monitoring stations PG-1, PG-2, and SP-3, sediment samples have been collected from the infiltration pond (SP-3, two samples) and PG-1 (one sample) locations for analysis of total mercury concentration (**Appendix A**).

Mercury was not detected (<1 mg/kg) in any sediment sample.

2.5 Geology

The general geologic setting of the Pioneer mining district is described in Section 1.3. Golden Rule's current operations target gold and silver from the sands and gravels of relic valley fill and terrace deposits located about 100 feet above the present day surface water in Pioneer Gulch.

Gold in Pioneer Gulch is primarily associated with gravels and sands deposited during the early glacial period of the Pleistocene epoch (Pardee, 1951). Repeated cycles of glaciation followed by stream erosion have resulted in a series of gravel layers of variable thickness resting on Tertiary "lake beds". The best gold grades occur in the lower, well-indurated, iron-oxide stained and cemented gravels deposited during the earliest of three major glacial events (**Figure 7**). This zone was intersected at a depth of about 30 feet during historic mining of the 1916 pit (**Figure 1**) located on the west side of Pioneer Gulch, approximately 2,100 feet to the south west of the South Pit Mining Area. A layer of rust stained intermediate glacial outwash also contains lesser amounts of gold and was intercepted at a depth of about 20 to 30 feet at the 1916 pit. The 1916 pit had a total area of 4,376 yards and produced about 711 ounces of gold (Pardee, 1951). Gold is not found in the "lake beds" and little gold is found in gravels deposited during the latest period of glacial erosion and subsequent deposition.

Elsewhere along the middle, east, and west forks of Pioneer Gulch, gold deposits were mined from gravels concentrated from the intermediate glacial drift (Pardee, 1951). In these areas the gold-bearing gravels were concentrated within the interstitial spaces of large boulders within the stream channel.

Squaw Gulch contains a large deposit of the typically gold-rich early glacial drift that was deposited along with other materials during landslides from the slopes to the north although commercial grade material was not found during prospecting in the early 1930s (Pardee, 1951). Golden Rule has conducted exploration in this area and may propose active mining operations in this area of Squaw Gulch at some point of time in the future.

2.6 Soils

The NRCS has completed a soil survey in the immediate vicinity of the project area (**Appendix C**) (NRCS, 2011). Soils in and around the area consist of gravelly loams with six principle soil map units occurring within areas where current or proposed mining operations would occur. These map units include 41C, 41D, 95E, 99E, 103, and 199E (**Table 4** and **Figure 8**). With the exception of map unit 103 (mine waste dumps) these soils and the other soil types surrounding the project area were rated by the NRCS as having a high potential for restoration following disturbance although map units 95E, 99E, and 199E are moderately susceptible to water erosion where they occur on steep slopes. No disturbances other than existing roads are

anticipated on soil map unit 95E.

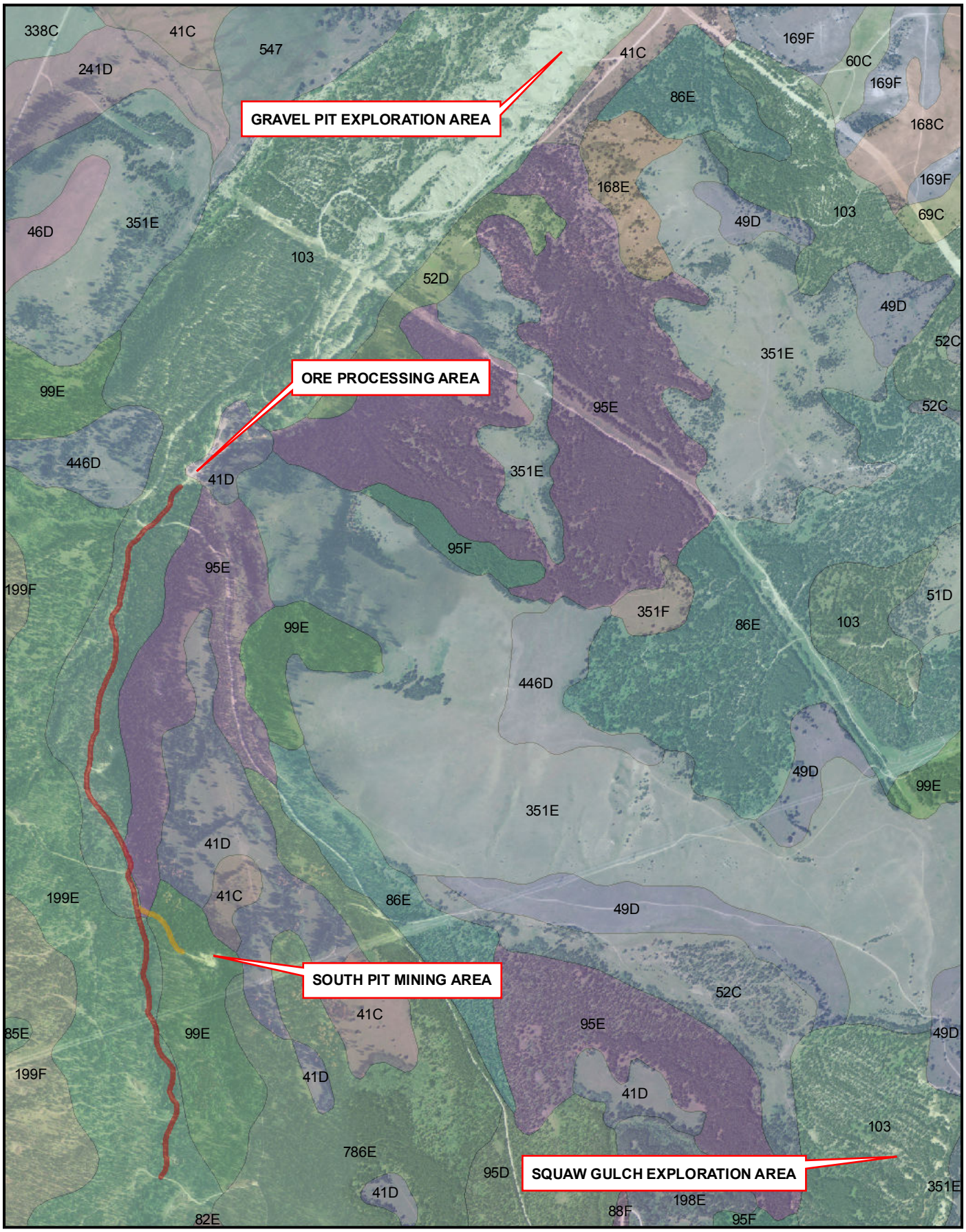
Figure 7. Photo of Pit South Mining Area Open-Cut Mine

(showing historic underground workings and well-indurated, iron-oxide cemented gravels).

Table 4. Soil Types Within Proposed Pioneer Gulch Mine Permit Boundaries

Map Unit Number	Name	Description[1]	Restoration Potential Rating
41C	Perma gravelly loam, 4 to 8 percent slopes	Somewhat excessively drained, gravelly to extremely gravelly sandy loam. Typic Haplustolls.	High
41D	Perma gravelly loam, 8 to 15 percent slopes	Somewhat excessively drained, gravelly to extremely gravelly sandy loam. Typic Haplustolls.	High
95E	Yreka gravelly loam, 15 to 35 percent slopes	Well drained gravelly loam. Typic Haplustalfs.	High
99E	Bignell gravelly clay loam, 15 to 35 percent slopes	Gravelly clay loam, Typic Haplustalfs.	High
103	Dumps, mine	Not described by NRCS Soil Survey. Likely consists of historic placer deposits.	Not Rated
199E	Bignell gravelly clay loam, cool, 15 to 35 percent slopes	Gravelly clay loam, Typic Haplustalfs.	High

[1] See Appendix C for detailed descriptions.



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2009 U.S. Farm Services Agency National Agricultural Imagery Program (NAIP)

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0 375 750 1,500 Feet

Access Roads
- Existing Pioneer Gulch Road
- Rehabilitated South Mining and Exploration Area Access Road

Soil Map
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 8

The soil survey did not describe map unit 103 but it consists of historic placer deposits (spoils) composed of gravels, cobbles, and boulders with little to no soil cover. The other soils in the area generally consist of gravelly to very gravelly loams to clay loams to a depth of about 10 to 15 inches. Below this depth the soils increase in both gravel and clay content. In areas the upper two inches of the soil horizon consists of slightly decomposed plant material.

Soil salvage activities were not conducted prior to summer 2012. As a result an unknown volume of soil was buried beneath waste rock during backfill operations at the South Pit. This was remedied in summer 2012 and approximately 1,000 cubic yards of soil are currently stockpiled at the pit. In order to provide an adequate thickness of growth media to reclaim the current disturbance, Golden Rule has also segregated and stockpiled fine waste rock sands during it ore processing activities. This material supports reseeded vegetation in areas where it was used to reclaim exploration disturbances and along the margins of the ore processing area. A fine waste stockpile of approximately 9,400 cubic yards is currently available for reclamation This volume of combined soil and fine waste should be adequate to reclaim the current pit disturbance with an approximate 1.2-foot thickness of growth media.

Beginning in early summer of 2012 salvageable soil was stripped from areas to be disturbed and stockpiled for use during reclamation activities. This practice would continue under the proposed expansion. More details of soil salvage and replacement activities are provided in Section 4.0.

Soils within the project area are not classified as prime farmlands or farmlands of statewide importance and do not have the potential to become so. Prime farmlands and farmlands of statewide importance are present along the valley floors located to the north of the project area. Mining operations are not proposed to occur in these areas.

2.7 Vegetation

Plant communities in the proposed permit area are primarily composed of xeric-mesic conifer dominated forests and woodlands (Montana Natural Heritage Program, 2011). This habitat includes stands of Douglas fir, lodgepole pine, and subalpine spruce. Small proportions of montane grasslands and deciduous shrublands are interspersed throughout the site. Rough fescue, snowberry, and bluebunch wheatgrass are also present (NRCS, 2011).

A botanist/wetland specialist conducted a wetland and vegetation resource survey on September 23, 2011. Areas visited included the Squaw Gulch and “1916 pit” exploration areas, the South Pit mining area, historic dredge location, and the ore-processing area. In addition to the plant species described above understory juniper fireweed, raspberry, strawberry, gooseberry, and kalmia where identified.

Plant Species of Concern (SOC) are not known to be present within the proposed permit areas and no SOCs have been identified in Township 9 N Range 11 W of Powell County (Montana Natural Heritage Program, 2011). Plant SOCs were not identified during the vegetation resource survey and it was determined that there is little to no potential for their presence based on the amount of historic disturbance in the area.

2.7.1 Weeds

The project area lies within the Gold Creek Weed Management Area where Canada thistle and spotted knapweed are responsible for the majority of weed infested acreage. Weed species are

present throughout the project area and its surroundings. These species include spotted knapweed, wooly mullein, black henbane, houndstongue, toadflax, and musk and Canada thistle.

Weeds are controlled in accordance with the Powell County Vegetation Management Plan as discussed in Section 3.7.4 (Powell County Weed Board, 2010).

2.8 Wildlife

Baseline wildlife studies have not been conducted in the proposed permit area but it is expected that wildlife frequenting the area are similar to those in other areas of the region where mountain forests interface with valley meadows and pastureland. This would include large ungulates such as deer and elk, various avian species, rodents, aquatic/riparian species such as fish and amphibians, black bear, coyotes, mountain lions, and bobcats.

Wildlife Species of Concern (SOC) are not known to have been specifically surveyed or identified within the proposed area of influence but SOCs have been identified in Township 9 N Range 11 W of Powell County (**Table 5**) (Montana Natural Heritage Program, 2011). The habitat types frequented by these SOCs are the same as are present within the proposed area of influence (i.e. conifer forests, streams/riparian areas) suggesting that these SOCs could also be present within the area of influence. However, it is not clear whether proximity to houses or ranching operations near the project area precludes the use of the area by these SOCs. In the case of far-ranging wildlife, it is likely that the project area comprises only a relatively small proportion of the total range used by wildlife during the year however the area may be used more frequently as winter range.

2.9 Cultural Resources

A pedestrian inventory of cultural resources was conducted on October 13, 2011 by Kyle Barnett of Tetra Tech. A detailed description of the inventory results along with a history of the Pioneer Gulch and Gold Creek area are provided by Tetra Tech (2011) and are summarized in here.

2.9.1 Mining History

Gold was first discovered in Montana in 1852 on what would become known as Gold Creek by Francois Finlay (Pardee, 1951). In 1853 the Stevens Expedition passed through the area surveying a possible railroad route to the Pacific. John Mullan, a topographical engineer for the party reportedly panned some gold from the creek and named it Gold Creek. The Pioneer area was nearly abandoned after gold was discovered in Bannack in 1862. Four years later however, interest in the area's potential was sufficient to form the Pioneer Mining District. The next year, 1867, saw the first use of hydraulic mining. Development accelerated two years later when Conrad Kohrs completed the sixteen-mile long Rock Creek Ditch to supply the large amounts of water needed for hydraulic mining. Water from the ditch enabled several hundred miners to work the terraces or bars over the next few years. Pioneer City was the dominant community during this time. The Pioneer District had produced an estimated 20 million dollars in gold by 1870. The major sub-district deposits of the Pioneer Bar and Ballard Mine were largely depleted by 1890.

Table 5. Wildlife Species of Concern Identified in Powell County T 9 N R 11 W

Scientific Name	Common Name	Habitat	State Rank[1]	BLM / USFS Sensitive Species
Gulo gulo	Wolverine	Conifer forest	S3	USFS, BLM
Lasiurus cinereus	Hoary Bat	Riparian and forest	S3	
Lynx canadensis	Canada Lynx	Subalpine conifer forest	S3	USFS[2], BLM[3]
Martes pennanti	Fisher	Mixed conifer forests	S3	USFS, BLM
Accipiter gentilis	Northern Goshawk	Mixed conifer forests	S3	BLM
Ardea herodias	Great Blue Heron	Riparian forest	S3	
Buteo regalis	Ferruginous Hawk	Sagebrush grassland	S3B	BLM
Carpodacus cassinii	Cassin's Finch	Drier conifer forest	S3	
Otus flammeolus	Flammulated Owl	Dry conifer forest	S3B	USFS, BLM
Strix nebulosa	Great Gray Owl	Conifer forest	S3	BLM
Troglodytes pacificus	Pacific Wren	Moist conifer forests	S3	
Oncorhynchus clarkii lewisi	Westslope Cutthroat Trout	Mountain streams, rivers, lakes	S2	USFS, BLM

[1] State Rank abbreviations as follows:

S2 At risk because of **very limited** and/or **potentially declining** population numbers, range and/or habitat, making it vulnerable to global extinction or extirpation in the state.

S3 Potentially at risk because of **limited** and/or **declining** numbers, range and/or habitat, even though it may be abundant in some areas.

B **Breeding** - Rank refers to the breeding population of the species in Montana. Appended to the state rank, *e.g. S2**B** = At risk during breeding season, but common in the winter*

[2] Considered a Threatened Species by USFS.

[3] Considered a Special Status Species by BLM.

By 1874, the richest deposits had been found and a company of some 800 Chinese miners was brought in to work the deposits by hand. China Bar at the north end of the district is named for them. Pioneer City had the third largest population of Chinese in the territory in the 1870s (Merritt 2010). An undisclosed, but possibly significant, amount of gold was recovered by these intrepid miners over the next fifty years (Pardee, 1951).

In 1904, an English mining company attempted to dredge the Pioneer placers with a small steam dredge; however, this venture was unsuccessful because of the larger boulders in the host materials. The Pioneer Dredge Company brought in a larger electric California-type bucket dredge (also known as a Yuba dredge). From 1933 until 1939, the Pioneer Dredge Company recovered more than 1.25 million dollars in gold. Derdging operations produced more gold than any other mine in the state for the year 1934. Production figures for the district show a marked increase in ounces of gold recovered during the years the dredge operated (Pardee, 1951). From 1904 to 1951, the district produced 65,000 ounces of gold. Most of that, 39,913 ounces, came during the years that the dredge operated. The War Production Board created in 1942 to

divert civilian industries to wartime manufacture effectively shut down gold mining for several years.

2.9.2 Cultural Resource Inventory

All areas of potential effect within the project area were intensively surveyed by pedestrian transect in October, 2011. Transect intervals were spaced at no more than 30 meters. All cultural properties were recorded on Montana Cultural Resources Information (CRIS) forms. No artifacts were collected in the field. The project area and cultural resources were photographed with a digital camera and their locations GPS surveyed.

The inventory recorded two historic sites and one historic isolated find (**Figure 9**). The historic sites consist of an historic dredge (24PW79) and a collapsed sluice box (24PW80). The isolated find is a single prospect pit (24PW81).

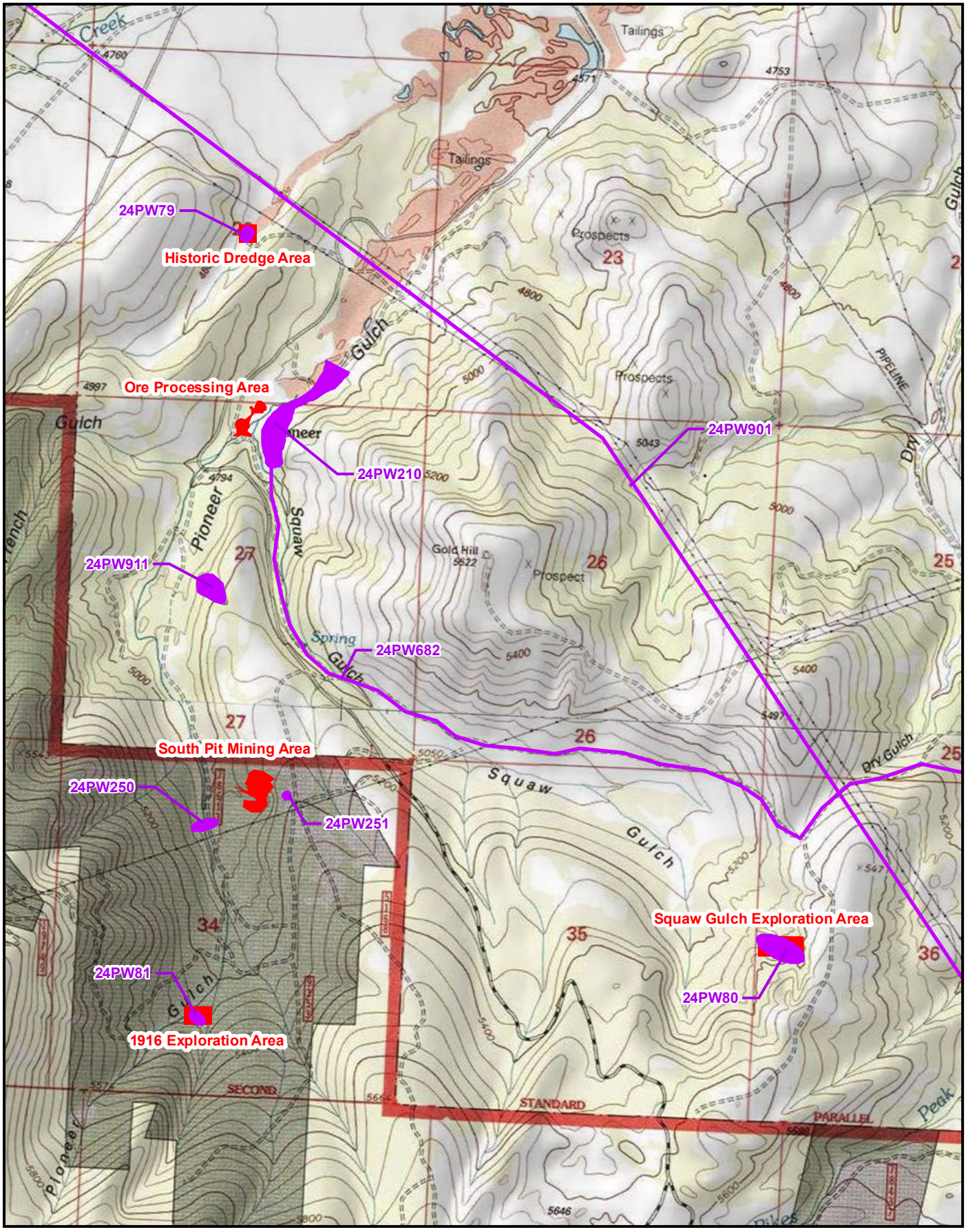
Site 24PW79 is the California-type bucket line dredge originally operated by the Pioneer Dredge Company from 1933 to 1941. It was the single highest producer of gold in the state of Montana in 1934. The dredge, in its eight year run produced nearly 40,000 ounces of gold from 7,500,000 cubic yards of material (Pardee, 1951).

The dredge is located in-situ in its dredge pond along Reservoir Gulch, between Gold Creek and Pioneer Gulch. This dredge is nearly complete with the bucket boom in front, pontoons, processing area and tailings boom still extant. There is some rust damage to the pontoons and the sheet metal siding. The wooden frame on the bucket boom has rotted away and several sheets of metal siding from the processing area are missing. The dredge pond measures approximately 240 ft. x 190 ft. x 30 ft. deep and the dredge measures 65 ft. x 30 ft. x 30 ft. tall. The superstructure is made by Bethlehem Steel as evidenced by a maker's mark on a right rear I-beam. The dredge itself had a 6,500 cubic yard per day capacity.

This site is considered significant for its association with the mining era in Montana and specifically, the Pioneer-Gold Creek Mining District. This site represents dredging, the final stage of mining activities in the District. Site 24PW79 is also significant for its contribution to the development of nearby Wall City. Wall City, located about two miles northeast of dredging operations, was built to house dredging crews (Sanders 1995). The site is also significant because the dredge is in good condition, and a rare example of the California type, bucket-line model. 24PW79 represents one of the few intact dredges left in Montana. Site 24PW79 is recommended eligible to the National Register and should be avoided by all mining activities.

Site 24PW80 consists of a collapsed sluice box and a section of pipe found in the Squaw Gulch pit which was hydraulically mined in 1930-31 by the Henderson Mining Company (Pardee 1951). This site is recommended not eligible to the National Register because it does not contribute individually to the district's period of significance, has no known association with persons important in history, and is unlikely to contribute information important to history.

Additionally, the sluice is not considered significant as sluices are common features across the mining landscape and this particular sluice is not considered to be an outstanding example of this feature type.



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USGS 100K SERIES TOPOGRAPHIC MAP

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Site Boundary

Cultural Resource Inventory Area

Cultural Resources in the Pioneer Project Area
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 9

The isolated find 24PW81 is a single prospect pit that measures 12 ft. in diameter x 10 ft. deep. The prospect pit is located on a gently sloping, north facing slope along Pioneer Gulch. Isolates are not considered to be a site, therefore, this find does not qualify for National Register evaluation.

2.10 Land Use and Water Rights

Land in the vicinity of the proposed project is a privately owned (Don Beck) ranch land held in a limited liability company called Beck Gold Creek Ranch, LLC (**Figure 2**). Golden Rule Placer Mining, Inc. has an underlying mining lease agreement in place with the ranch owner to placer mine gold on his property. Upon completion of mining, the land use is expected to revert back to ranching.

A review of the DNRC water rights database identified only one water right in the area. A surface water statement of claim (No. 76G90477) is on file in the name of Beck Gold Creek Ranch LLC for the purpose of mining. The claim has a priority date of 1890 for the amount of 2.5 cubic feet per second and is located in the general vicinity of the ore-processing area. The Department of Agriculture holds two more senior statements of claim (1874) up stream along French Gulch in section 33. Both are listed as livestock use direct from source with no amounts listed. The nearest downstream water right is located approximately 1.5 miles to the northeast in the southwest quarter of section 14. There is no continuous surface water flow between the ore-processing facility and the nearest downstream water right due to disturbances from historic dredging operations. In this area water moves through the deranged alluvial valley fill material, spoils, and dredge ponds as groundwater.

2.11 Wetlands and Floodplains

The US Fish and Wildlife Service reported the results of wetlands and riparian delineations in the proposed area of influence (USFWS, 2011). Delineated wetlands/riparian areas included 2.8 acres of forested/shrub riparian area along Squaw Gulch, a total of 0.37 acres of freshwater ponds (a total of three ponds) along Pioneer Gulch, and two additional freshwater ponds totaling 0.18 acres further to the northwest (**Figure 4**).

NRCS soil data for the area do not indicate the presence of hydric soils (Section 2.6). The description of gravelly well-to-excessively drained soils covering the majority of the permit area suggests that soils at the site would not support wetland vegetation or biota except in riparian areas and/or in low lying areas along the foot of active or abandoned terraces. This conclusion was confirmed during a preliminary wetland resource survey conducted on September 23, 2011. Because of the timing of the visit it was not possible to conduct formal wetland delineations. However, areas supporting wetland vegetation were identified within the project area (**Figure 4**). These areas included grounds adjacent to the water supply ponds, the infiltration pond, the historic dredge, and adjacent to the roadway leading north from the process area.

It is not clear whether the potential wetlands identified during the preliminary wetland survey are jurisdictional wetlands subject to permitting under Section 404 of the Clean Water Act. There is no surface water connection between these locations and the nearest downstream expression of channelized flow of surface water (Gold Creek), the nearest navigable water of the U.S. (Clark Fork River).

The Army Corps of Engineers (Corps) was consulted regarding mine operations involving the water supply pond. This pond was constructed prior to Golden Rule's operation using an end-

of-stream dam. The Corps found that no permits are required by Golden Rule to continue to use the pond as a source of water as long as no modifications to the dam or pond banks are conducted (USACOE, 2012). Furthermore, Golden Rule has no plans that would directly or indirectly impact wetlands as no dewatering or dredge and fill activities would be conducted and all mining activity would occur away from streams in areas that do not support wetlands.

Golden Rule previously applied to the Powell County Conservation District for a 310-Permit (application # DLV-12-12) to enlarge the existing water supply impoundment by relocating the impoundment dam approximately 100 feet to the north. Although Golden Rule no longer plans to modify the pond, the Conservation District granted the 310-permit on the grounds that Pioneer Gulch does not support a fishery and that all surface water infiltrated into the ground in the vicinity of the no longer proposed relocated dam. A Montana Fish, Wildlife, and Parks representative was present during the Conservation District's inspection for the 310-permit application, and concurred with the Conservation Districts conclusion with respect to granting of the 310-permit for modification of the facility.

3.0 OPERATING PLAN

This section of the Application describes the activities, their locations, and surface disturbances that are proposed to occur with or in support of placer mining operations at the Golden Rule's Pioneer Gulch project site. All activities, and proposed or existing facilities, including those required for exploration, mining, ore-processing, and mine support will occur on privately-owned land.

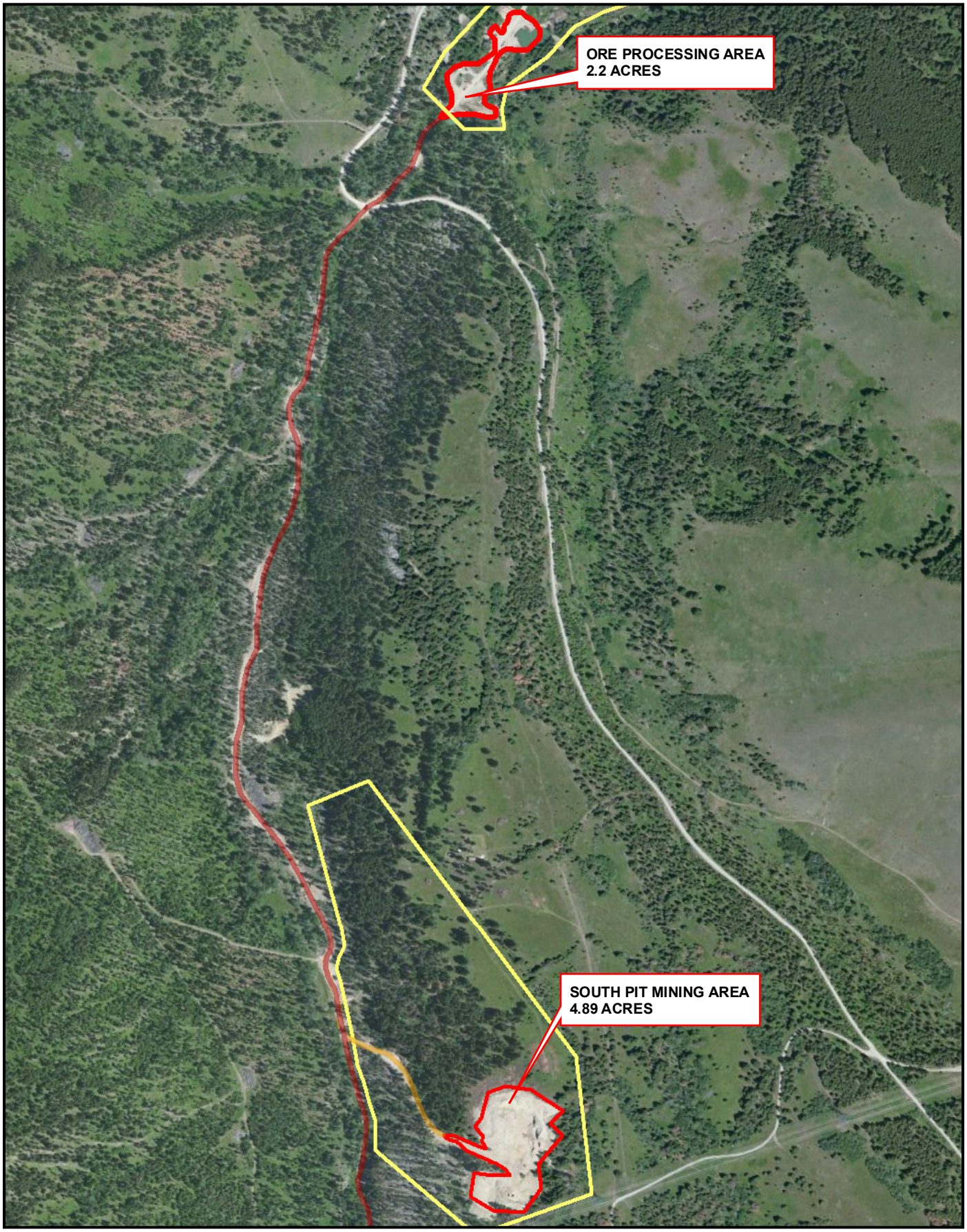
The proposed expansion of mining operations is limited to an increase in the disturbance footprint associated with the expansion of mining in the South Pit Mining Area and an increase in area of the ore-processing site to accommodate new processing equipment and parking. Mining operations in the South Pit area are expected to occur over a minimum 5-year mine life. Expansion of mining and ore-processing activities into the Squaw Gulch and the Gravel Pit exploration areas is also under consideration by Golden Rule and if proposed for mining in the future an application would be applied for under an Amendment to the Operating Permit. These activities are discussed in Section 5.0. Additional facilities are proposed to be built within the currently disturbed ore-processing area and additional equipment will be used to excavate, transport, and process the placer gravel material. **Table 6** is a summary of proposed disturbance areas in the Golden Rule Project area. The following sections describe current and future activities proposed for mining areas, ore-processing areas, and exploration areas as well as proposed equipment usage in active portions of the project area.

Table 6. Proposed Disturbance in the Golden Rule Project Area

Surface Disturbance Area	Acres		
	Existing Disturbance	Proposed Additional Disturbance	Total Disturbance
Expansion of the South Pit Mining Area	4.9	15	20
Access road to South Pit Mining Area	0.5	0	0.5
Ore-processing area	2.2	2.8	5
Grand Total	7.6	17.8	25.5

3.1 Existing Approved Operations

Golden Rule is currently approved for placer mining and ore-processing under two Small Miner's Exclusion Statements (SMES) that were submitted to, and reviewed and bonded by the Montana Department of Environmental Quality. One of the Exclusion Statements approves placer mining operations from an open-cut excavation of terrace gravels on what is currently a 4.89 acre disturbed site called the South Pit Mining Area located in the north central portion of section 34 (**Figure 10**). The other reviewed and bonded Exclusion Statement approves operations at the ore-processing site, which currently covers an area measuring 2.2 acres located in the north central portion of section 27 and south central portion of section 22, approximately 1 mile due north of the mining site (**Figure 10**). Ore-processing operations



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2011 BING Map Services

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Proposed Permit Boundary

Access Roads

Existing Pioneer Gulch Road

Rehabilitated South Mining and Exploration Area Access Road

Current Ore Processing Area and South Pit Mining Area
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 10

currently consist of a trommel-based wash plant and sluice boxes, and jig and roughing table circuits for use in separating free gold from the excavated placer gravels using water pumped from two water supply ponds constructed in series. The process water supply and infiltration ponds are discussed in greater detail in Sections 2.11 and 3.6.2. While these SMESs have been adequate for past operations a proposed change in the size of the area to be mined in the South Pit area and an increase in the size of the ore-processing area, requires an Operating Permit from the State of Montana's DEQ. This document is the application for an Operating Permit from the DEQ. Many of the current mining and processing components of the operation will remain unchanged under the proposed mine expansion. Current and proposed mining operations are described in the following sections.

3.2 Proposed Operating Plan

The Mine Operating Permit application requires the description of proposed activities and surface disturbances in the mining and ore-processing areas. The proposed expansion of operations would increase the disturbance area by 17.8 acres principally to expand mining operations in the South Pit area. Additional areas (i.e., Squaw Gulch, and the Gravel Pit areas) would be entered for exploration purposes under Golden Rule's existing Exploration License and may be proposed for mining in the future if found to be economically viable. The following sections describe activities that would be conducted, equipment that would be used, and surface disturbances related to the proposed expansion.

3.2.1 Expansion of the South Pit Mining Area

The open-cut South Pit Mining Area is located on the east side of the Pioneer Gulch valley, some 100 feet in elevation above the nearby creek (**Figure 1**). The open-cut mine is accessed by travelling approximately 1.2 miles south of the ore-processing area along an existing road along Pioneer Gulch and from there along about a 0.15 miles stretch of rehabilitated road heading east-south-east from the Pioneer Gulch road to the South Pit Mining Area. The current disturbance footprint of the South Pit Mining Area is approximately 4.89 acres.

The mining methods used are similar to conventional gravel mining operations and include excavation, loading, and hauling of gravel to the ore-processing area. In some localized areas, where the gold-bearing gravels are particularly well-indurated (**Figure 7**), drilling and blasting of the gravel is conducted by a contract drilling and blasting company. Explosives are not stored on site. The mining sequence is initiated by clearing and grubbing followed by salvaging and stockpiling of top- and sub-soil from areas that will be disturbed by mining or support facility construction. Mining expands from small pits to expose the bottom of the gold-bearing gravels and then extends laterally in a series of mined benches to mine out the deposit.

Mining operations are currently conducted by three or four equipment operators working one ten-hour shift per day. This work schedule is expected to increase to three eight-hour shifts per day in future production scenarios as described in Section 3.4. Equipment used for the Golden Rule placer mining operation is listed in **Table 7**. A tracked-excavator is typically used to break and move the ore. Ore is either loaded directly on to haul trucks (two 40 ton, and one 25 ton) or stockpiled to be re-handled using a loader to place ore onto the trucks for hauling to the ore-processing area. After processing the ore, barren gravel is back-hauled to the pit for reclamation backfilling purposes. A 1,000 gallon water truck with a spray bar is used for dust control on haul and access roads. Auxiliary equipment used in the mining operation includes a road patrol (grader), service and blasting support trucks, and blast hole drilling equipment. Snow removal along haul and access roads is conducted seasonally as needed using existing mine equipment.

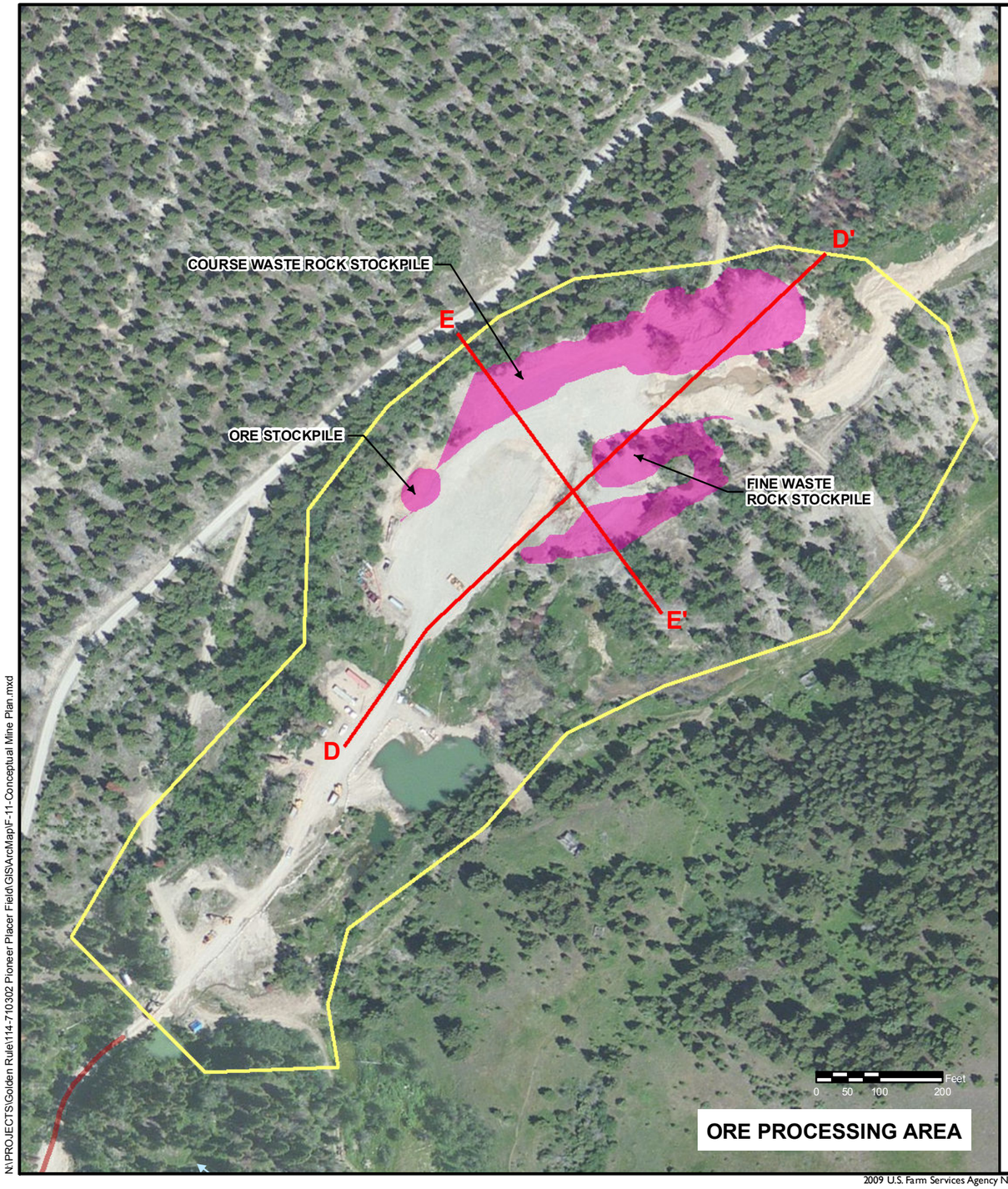
The ultimate size and shape of the South Pit is not well defined as ore delineation of the minable unit is developed concurrently with mining activity after initial exploration activities are conducted. The decision to mine a unit or not is often based on gold grade and the relationship of the ore-bearing gravel to topography that is favorable for mining. Most gold–bearing units in the Pioneer Gulch area occur as gravel terraces located on valley sides and are elevated above the existing stream. These minable geomorphic features formed as the stream down-cut through previously deposited gold-bearing gravels leaving the newly formed and stacked terraces topographically above the fluvial channel located along the modern valley floor. Once actual mining begins the configuration of the pit is determined by excavations that follow the gold-bearing units along these elevated terraces rather than into favorable areas that have been previously defined by exploration drilling or trenching.

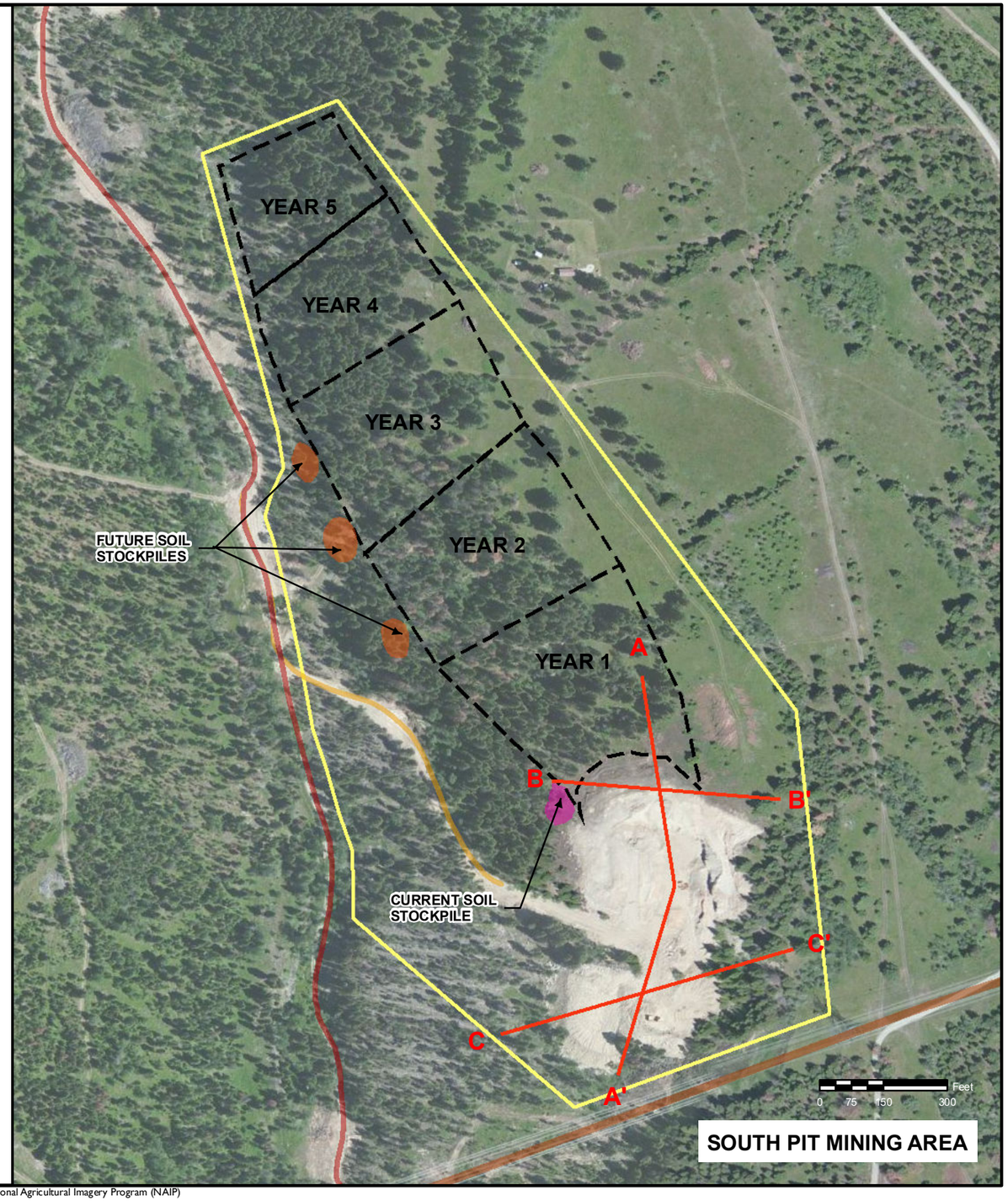
As described above, mining currently occurs in the South Pit Mining Area under Small Miner's Exclusion Statement. An Operating Permit will be required in order to continue mining in this area as the pit would expand beyond the size allowed by the SMES. Mining in the South Pit area is expected to increase in size to cover an area of about 20 acres over the currently projected 3-5 year mine life of the South Pit deposit. An attempt has been made to predict the geometry of the expansion for the South Pit over the next 3-5 years (**Figure 11**). The area shown covers 20 acres in order to illustrate the approximate size of the 5-year pit if not its precise configuration and placement.

Table 7. Equipment Used for Mining Operations

Type	Number	Other details
Tracked Equipment		
325 Caterpillar Excavator	1	Possible upgrade to 350 Cat considered for future operations[1].
988 Caterpillar Loader	1	Used occasionally
D155 AX Komatsu Dozer	1	Used to clear vegetation, regrade, and push gravels.
D-8 Dozer	1	Used to clear vegetation, regrade, and push gravels.
Haul Trucks		
40-Ton Rock Truck	2	Used to haul gravel to ore-processing area and back to pit after washing.
25-Ton Rock Truck	1	
Blasting Equipment[1]		
Blast hole drill	1	Used locally as needed
Blasting Support Truck	1	
Other Equipment		
Water Truck With Spray Bar	1	1000 gallon capacity used for dust suppression on access roads and at ore-processing area.
Service Truck	1	12 Ton

[1]The anticipated acquisition of a larger tracked excavator may preclude the need for future drilling and basting. No explosives are stored on site.





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2009 U.S. Farm Services Agency National Agricultural Imagery Program (NAIP)

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- Proposed Permit Boundary
- Waste_Soil_Stockpiles
- Transects - See Figures 16 through 20
- Approximate 5-Year Mining Sequence
- Townsend-Garrison Poweline Easement

Access Roads
- Existing Pioneer Gulch Road
- South Pit Access Road

Proposed Conceptual Mine Plan
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 11

3.2.2 Exploration Areas

Exploration activities typically proceed by clearing and grubbing, and stripping and stockpiling of soil and subsoil from the area to be explored. Then an excavator is used to dig trenches in prospective gravels and load this material into a truck which hauls the gold-bearing gravel to the ore-processing area. The gravels are batched (in 200 to 500 cubic yard lots) through the existing ore-processing circuit for evaluation. Often several exploration trenches are used to test a prospective area. Once a gold-bearing deposit of sufficient grade is discovered, its general trend with respect to adjacent topography is determined. The decision to mine the unit or not is often based on gold grade and the relationship of the ore-bearing gravel to topography that is favorable for mining.

Several exploration target areas on the Golden Rule Project site have been identified and approved for exploration under Golden Rule's Exploration Licenses (#28-111 and 28-111B). Exploration in these areas is in varying stages of completion. Additional exploration target areas are discussed here because of their likely potential to become future open-cut mining operations. These areas include the following locations identified on **Figure 12:**

1. Squaw Gulch - exploration area within which exploration is now complete; a new open-cut mine and processing facilities are under consideration by Golden Rule for this area. If a decision is made to proceed with mining in this area it will likely be proposed as an Amendment to this Application for an Operating Permit (see Section 5.0 below).

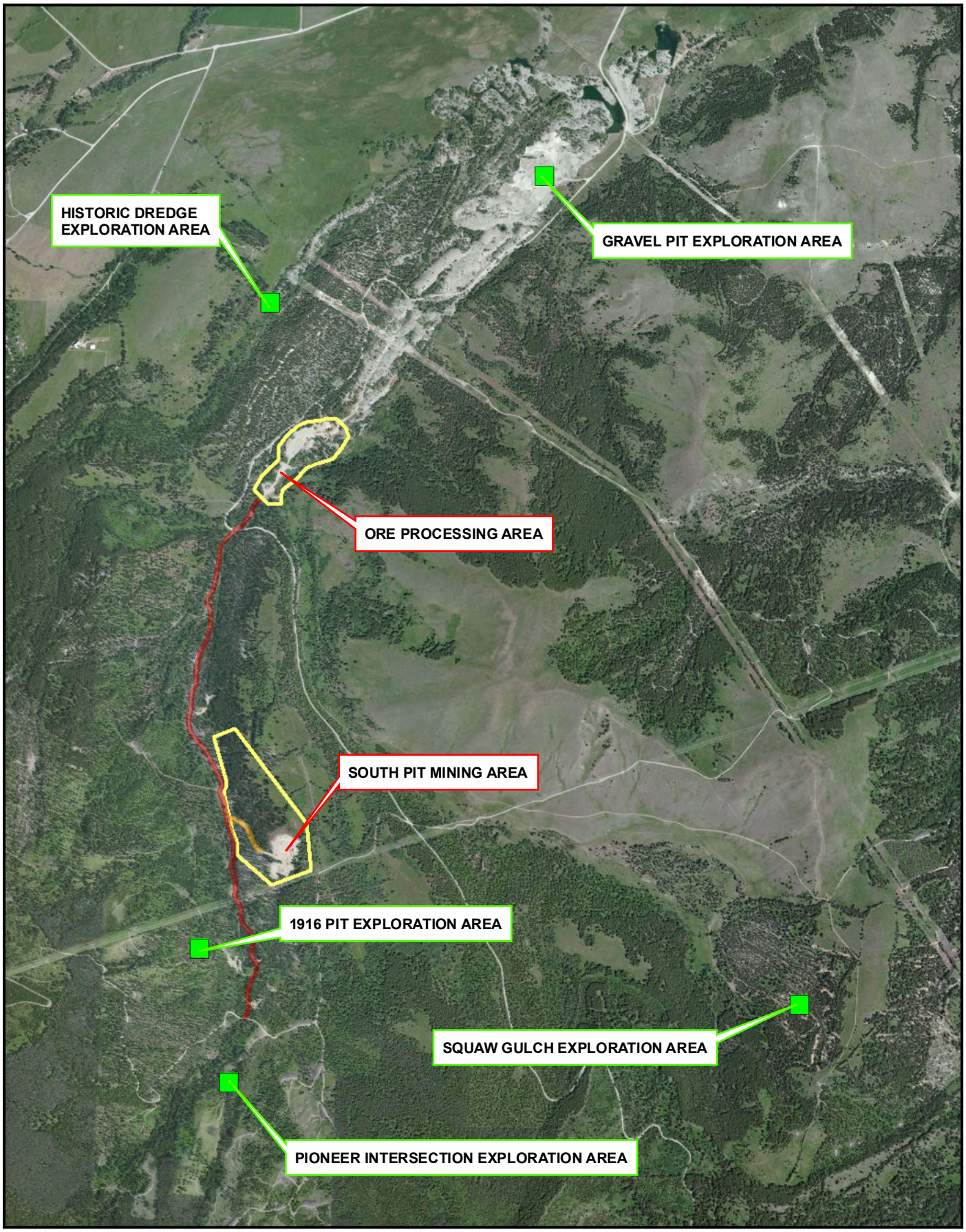
2. An area south of the 1916 pit area was approved for exploration and has been explored and reclaimed.

3. The area adjacent to the historic floating dredge in section 22 is as yet unexplored.

4. The area about 1,500 feet south of the T-intersection on the Pioneer Gulch road and above the PG-1 surface water sampling site is as yet unexplored.

5. And an as yet unapproved exploration area near the existing gravel pit and pond located within the historic mine spoils approximately 1.5 miles northeast of the current ore-processing area. This area has become highly prospective based on the addition of the jig and roughing table to the ore-processing circuit that allows for enhanced recovery of fine gold from previously mined tailing and spoils. Should the Gravel Pit exploration area be identified as a new mining area based on future exploration activities, it is likely that the current ore-processing facility would be either relocated to the gravel pit location or new or additional equipment purchased for installation at the gravel pit location (Section 5.0).

Additional areas may also be added for exploration during the life of mine using the same practices, equipment and exploration and permitting procedures as those described above.



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2011 BING Map Services

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Proposed or Potential Exploration Areas
Proposed Permit Boundary
Access Roads
Existing Pioneer Gulch Road
Rehabilitated South Mining and Exploration Area Access Road

Proposed or Potential Exploration Areas
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 12

3.3 Ore-Processing and Support Facilities Area

The location of the ore-processing and support facilities area is shown on **Figure 10** and a more detailed map of facilities and features contained within this area is shown on **Figure 13**. This site was originally an area of late 1800s placer operations, where disturbed alluvial valley fill materials and stacked dredge tailings piles were mined adjacent to the historic town site of Pioneer (**Figure 13**). As discussed in Section 2.3.1, there is no flowing channelized surface water in this area, but instead water moves through the deranged alluvial valley fill material, spoils and dredge ponds as groundwater. In the vicinity of the current ore-processing facility area, these turn of the century placer mining spoils were disturbed more recently by placer operators prior to Golden Rule taking over the operations. The ore-processing and support area is defined by the maximum area of more recent disturbance and covers an area of about 2.2 acres and includes the two previously constructed water supply ponds. The processing area is proposed for expansion to a size of 5 acres in order to accommodate future modifications to the processing equipment and possible enlargement of the water supply ponds. **Table 8** presents a list of currently used equipment at the ore-possessing and mine support facility area.

3.3.1 Ore-Processing Circuit and Facilities

The ore-processing circuit used by Golden Rule consists of a large trommel-based wash plant and sluice box from which relatively coarse gold is recovered. The ore-processing procedure is shown schematically in **Figure 14**. The wash plant is nominally rated for a 150 cu. yds. per hour production rate, but typically operates at about 100 cu. yds per hour, during ore-processing. Mined gold-bearing gravels stockpiled near the wash plant for processing are loaded into the trommel hopper through a screen deck designed to remove boulder- and cobble-sized material. Water is pumped from the lower of the two process/storage ponds located at the south end of the ore-processing area (**Figure 13**) at a maximum rate of 1,400 gallons per minute. One thousand gallons of this water is delivered to the trommel which is capable of processing a maximum of 150 tons of gravel per hour.

A slurry of finer material is passed out the bottom of the sluice box, through a screen, and into a tank where it is slurry-pumped through a two stage screen deck that separates material into plus ½-inch and minus ½-inch fractions. The screen plant located below the sluice box typically separates material into a 60-75% rock fraction and a 25-40 % sand fraction.

This minus ½-inch material is moved using a sand-screw to the top of a newly constructed pole barn where it is introduced into one of two parallel circuits each containing a jig plant and a roughing table. The remaining 400 gallons per minute of water from the suction pump at the lower process pond is delivered to the jig facility circuits via a constant head tank. Each of the two jig circuits is capable of processing about 15 yards per hour. Process water (1,000 gallons per minute) from both the wash plant and roughing tables is recirculated back to the lower pond where it is recycled for use in ore-processing. Recycling of process water allows for continuous operation of the ore-processing circuits as there is no wait period for refilling of the ponds, as there used to be when process water was not recirculated. Water that is not capable of being captured for recycling ultimately discharges to a French drain and from there into an infiltration pond located at the north end of the processing area in previously mined placer gravels (**Figure 13**).

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Detail of Ore Processing Area and Facilities
Golden Rule MIning Company
Gold Creek, Montana
FIGURE 13

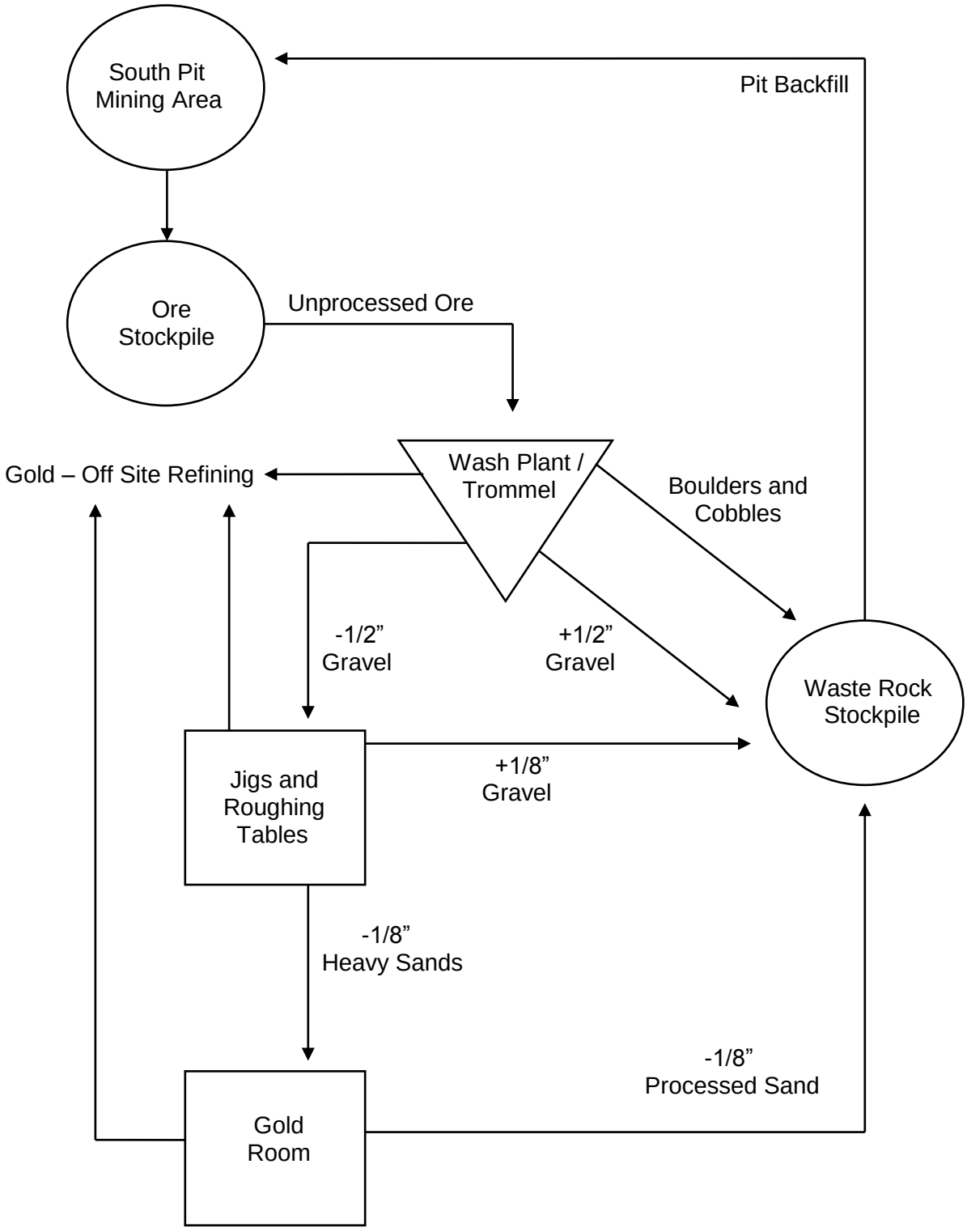


Figure 14. Ore Processing Flow Chart

Table 8. Equipment Used at the Ore-Processing/Wash Plant Area[1]

Equipment Type	Number	Other Details
Komatsu 300 excavator	1	1 CY bucket capacity. A second excavator (Cat 325, 1 ¼ CY) may be added if historical tailings are mined at gravel pit site.
966 Caterpillar Loader	1	4 3/4 CY bucket capacity. A second loader (Cat 988, 7 ½ CY) may be added if historical tailings are mined at gravel pit site.
D155 AX Komatsu Dozer	1	
Goldfield Trommel	1	150 tons/hour capacity, run at 100 yards per hour.
Grumman 170 HP pump	1	12-inch suction and 8-inch discharge lines, as much as 4,000 gpm. Run at 1,400 gpm to wash plant.
25 HP Return Pump	1	6-inch suction and discharge lines returning water to supply pond.
Eagle 25 HP slurry pump	1	Pumps ½-minus to screen deck.
Sand screw	1	Moves ½-minus material to jig room.
Screen deck	1	
42-inch jigs	2	
Roughing Tables	4	
Conex boxes	2	8' x 30'
Portable Toilet	1	Under contract
230 KW Generator	1	Power supply.
100 KW Generator	1	Backup power supply.
10 KW Generator	1	Used to power Gold Room and proposed mechanic's shop.

[1] Service truck and water truck listed in Table 7 are also used at ore-processing area.

The jig-roughing table circuits, produces a minus 1/8-inch fraction of concentrated heavy mineral sands containing relatively fine gold that is transported to the newly constructed "Gold Room" building. In this facility the concentrate is further processed through various pieces of equipment including: an automatic feeder, a bench scale trommel, shaker and finishing tables, drying ovens, a magnetic separator, and a gold wheel. Power to this building is provided by a 10Kw Honda generator. Coarse and fine gold recovered from these processes (which do not employ the use of processing chemicals) are shipped to a refiner for final processing. Processed gravel is returned to the South Pit Mining area for reuse as reclamation backfill for the open-cut mine.

With the addition of the jig/roughing table circuits, Golden Rule now finds that it is capable of profitably reprocessing its own tailings from the simple trommel-sluice box system originally operated at the site. The addition of these circuits also makes re-mining of previously processed tailings and spoils possible from gravels mined in the late 1800s. These gravels often contain significant amounts of relatively finer gold that can be reprocessed at a profit at

today's gold prices. As a result of this, Golden Rule has conducted preliminary exploration in the vicinity of a gravel pit developed in previously mined materials located to the west of the county road approximately 1.5 miles north of the current ore-processing facility (**Figure 12**). If the gravel deposits in the area were to ultimately become a viable mining option, a new processing facility might be set up in the gravel pit area which would require an amendment to any existing operating permit.

Equipment used for ore-processing as well as mobile equipment used to move ore-bearing and barren gravel within the processing area are listed in **Table 8**. Support vehicles and mobile equipment will use discriminating backup alarms that comply with MSHA requirements. Additional equipment may also be acquired if there is a significant future increase in mine production.

Other equipment, belonging to other individuals is stored in a separate surface storage area at the ore-processing/wash plant site and includes: a 44 cubic yard hopper, an old trommel, and excavator bucket, two trucks and a jeep.

3.3.2 Support Facilities and Equipment

The jig and roughing table circuits and the "Gold Room" described in the preceding section are housed in two separate newly constructed buildings at the ore-processing area. The building housing the jig and roughing tables is constructed just east of the trommel. It is a 20 x 30-foot pole barn with sides measuring 14 feet high tall. It has metal sidingand a metal roof and is constructed on a 4-inch thick reinforced concrete slab, constructed on grade. The building has two floor drains.

The other building, dedicated to final gold recovery, lies at the southwest end of the ore-processing area. It is also a 20 x 30-foot pole barn with metal siding and a metal roof, but its sides are only 9 feet tall. It is also constructed on a 4-inch thick reinforced concrete slab, constructed on grade with two floor drains that drain to the underlying rock and gravels that the ore-processing area is located on (no processing chemicals are used). Power is supplied to this building by a 10Kw Honda generator, and the building was wired by a MSHA certified electrician.

Other existing facilities include a pumping station, a tent, two 8 x 30' Conex boxes, a fuel storage area, and a portable toilet facility.

A 50' x 70' mechanic shop is proposed for construction in the summer of 2012, at the current location of the two Conex boxes on **Figure 13**. It will also be a pole barn, with 20-foot sides, metal siding and roof, and constructed on a reinforced concrete, thickened edge, slab on grade. The floor design will provide containment for lubricants and other shop fluids with several floor drains reporting to a storage tank for the collection of oil and grease contaminated water. The shop will perform regular maintenance and repairs to mine equipment and will also store supplies, parts, small quantities of lubricants, and other items to support the project. Power will be supplied by the same 10Kw generator that powers the Gold Room.

Two parking areas are also designated within the ore-processing area and include equipment (approximately 60' by 80') and an employee (approximately 40' by 70') parking areas (**Figure 13**).

3.4 Personnel Requirements

Exploration, mining, and ore-processing activities currently operate ten hours per day, five days per week, and 12 months per year (weather permitting). Under this scenario, the current operation employs one (1) project manager/supervisor and six (6) hourly equipment operators. This work schedule is expected to increase to three eight-hour shifts per day in future production scenarios as described in Section 3.4.

Once the ore mining and processing operations are functioning effectively enough to warrant the expansion of its work force, Golden Rule anticipates expanding its operations to three eight-hour shifts per day, seven days per week and 12 months per year (weather permitting). This expansion would require a total of 22 employees, one Project Manager, and a shift supervisor and six hourly equipment operators per shift. Golden rule envisions that this expansion of its work force might take place as early as the third quarter of 2012. Employment numbers for each of these scenarios is presented in **Table 9**.

Table 9. Number of Employees

Employee	Number
One-10 hour shift per day (current operation)	
Project Manager / Supervision	1
Hourly Employees	6
Total	7
Three 8-hour shifts per day	
Project Manager	1
Shift Supervisor	3
Hourly employees	18
Total	22

3.5 Temporary Shutdown

Seasonal or short term cessations of mining may occur due to limited access, weather, or wild fire conditions. In these instances mobile equipment may be temporarily removed from the site if necessary to avoid damage, but non-mobile equipment and facilities would remain. No further actions would be taken.

Longer cessations of mining may occur based on economic conditions. In the event of a long-term but temporary shutdown, Golden Rule would take measures to ensure the continued environmental stability of the site and to preserve facilities and equipment for eventual resumption of mine operations. Such measures would include the following;

1. Mobile equipment would either be moved off-site or stored in the parking areas located at the ore-processing area.

2. The portable toilet would be moved off-site and the tent would be taken down and stored either off-site or inside one of the steel-sided buildings (e.g. the Gold Room or mechanic's shop).

3. Diesel and gasoline would remain on-site for use by the private landowner.

4. Disturbances related to exploration or mining would be revegetated to prevent weed invasion and steep slopes and high walls would be regraded and/or fenced to prevent access and eliminate geotechnical instabilities.

5. An overflow culvert would be installed in the lower water supply pond to allow the pond to overflow if necessary and infiltrate into the ground on the downstream side of the dam.

3.6 Special Systems

A number of special or ancillary systems are in place to support mine operations at the Pioneer Gulch mine. These systems are described in the following sections along with any modifications that would be required for the proposed expansion of mining operations.

3.6.1 Access roads

Roads used to access the exploration/mining and ore-processing areas consist of privately owned ranch roads that cross county roads at some intersections. Roads used for current mining operations are maintained by Golden Rule who provides grading, erosion control, drainage control (culverts, grading and silt fencing), and snow plowing as needed. These activities would continue and be expanded to new exploration areas. No new access roads are required in support of existing or expanded mining operations. However, minor temporary roads may be required in the perimeter areas of the south pit operations during expansion of mining into these areas.

3.6.2 Water Supply and Use

Water used for ore-processing is supplied by two ponds at the south east end of the ore-processing facility (**Figure 13**). The ponds are fed by Pioneer Gulch and Squaw Gulch Creeks. A review of the DNRC water rights database identified only one water right in the area. A surface water statement of claim (No. 76G90477) is on file in the name of Beck Gold Creek Ranch LLC for the purpose of mining. The claim has a priority data of 1890 for the amount of 2.5 cubic feet per second (approximately 1,100 GPM) and is located in the general vicinity of the ore-processing area. The Department of Agriculture holds two more senior statements of claim (1874) upstream along French Gulch in section 33. Both are listed as livestock use direct from source with no amounts listed. The nearest downstream water right is located approximately 1.5 miles to the northeast in the southwest quarter of section 14. There is no contiguous surface water flow between the ore-processing facility and the nearest downstream water right due to historic dredge operations. In this area water moves through the deranged alluvial valley fill material, spoils and dredge ponds as groundwater.

When ore-processing is active, water is pumped from the ponds at a rate of 1,400 GPM a using a pump (12-inch intake with 8-inch discharge) powered by a generator (**Figure 15**). Water travels through an 8-inch diameter supply hose to the trommel operating at the processing area. The water level in the supply ponds was historically drawn-down by approximately by 15 feet one to two times every two to three weeks to provide water for ore-processing. Under the proposed expansion of mining activities water use would be greatly reduced by recycling process water back to the lower pond from the trommel/sluice box and jig/roughing table circuits at a rate of 1,000 GPM. The recycled water is of sufficient volume that ponds are not expected to be significantly drawn down even during extended periods of operation. The proposed ore-

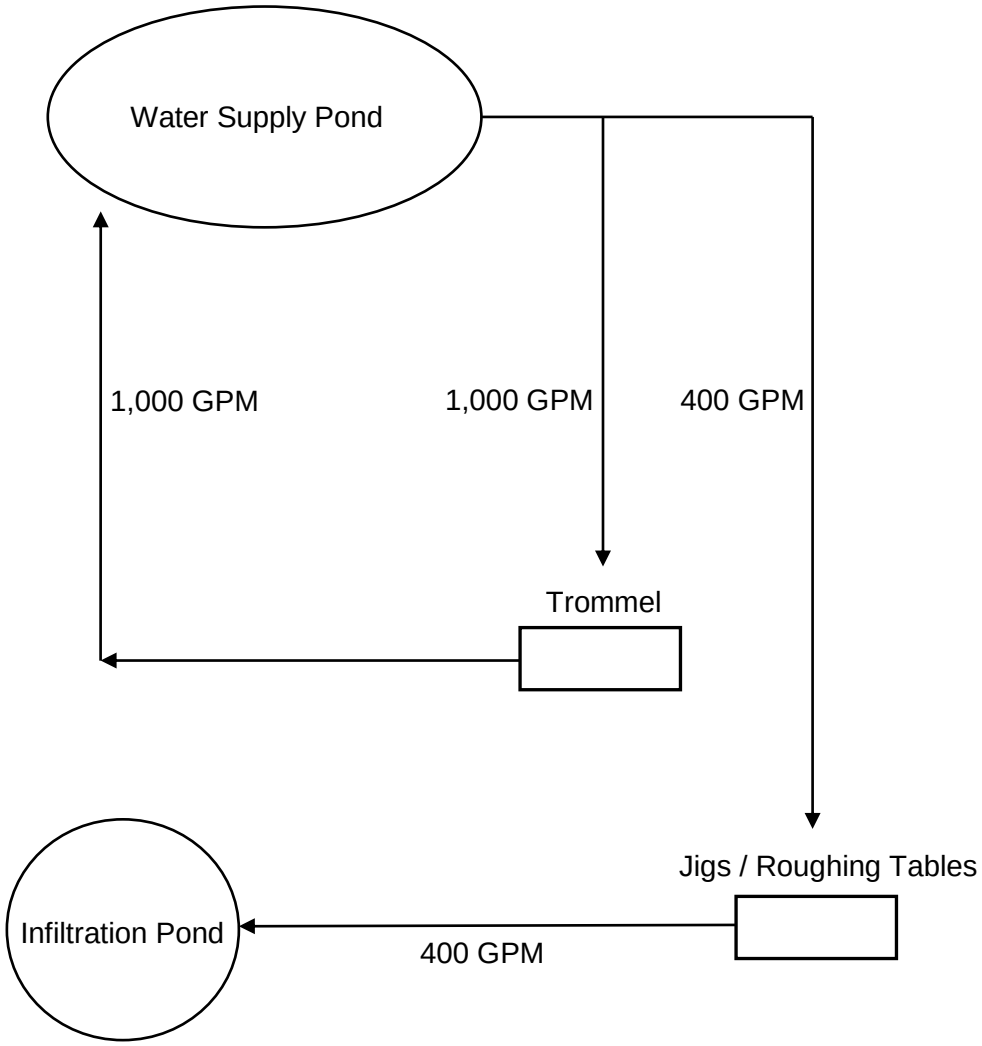


Figure 15. Water Balance Flow Chart.

processing facility is anticipated to have minimal consumptive use of water and is not anticipated to infringe upon the nearest water right located 1.5 miles downstream.

3.6.3 Water Treatment and Disposal

Water that is not captured in the recycling process (about 400 gpm) is discharged from the trommel area into a French drain which leads to an infiltration pond (**Figure 13**). Discharge water is of good quality with elevated levels of iron, manganese, and total dissolved solids based on sampling of residual water from the infiltration pond (Section 2.3.1 and **Table 2**). This is likely due to entrainment of suspended sediment in the ore-processing effluent which subsequently settles out of solution in the infiltration pond over time.

3.6.4 Fuel Storage and Handling

Diesel fuel is stored in the ore-processing area (**Figure 13**) in two above ground tanks. The primary storage uses an 8,000 gallon tank and there is a 2,000 gallon reserve tank that is usually empty, but used to store fuels in excess of 8,000 gallons when fuel is delivered to the site. A 500 gallon gasoline tank is also located in the same area. Fuel is delivered to the site by a licensed carrier on an as needed basis. The current level of activity requires one load per month; future activity levels may require two to three loads/month.

Refueling of mobile equipment used and staged, in the ore-processing and wash plant area, including exploration and mining rock trucks, takes place at the fuel storage site. Remote mobile excavating and loading equipment at the mining sites are refueled from a 120 gallon diesel storage tank mounted on a mechanical/lubricant service truck. All refueling equipment and storage tanks have automatic shut-off valves and flexible steel delivery hoses.

Secondary containment for the tanks consists of an excavated earthen, HDPE-lined basin with embankments approximately 24 inches tall. The containment area has been sized for 110% of the total capacity of tanks located in the storage area. The fuel storage area is routinely inspected and approved by and MSHA.

A combined Storm Water Pollution Prevention Plan (SWPPP) / Spill Prevention Containment and Clean-Up (SPCC) addresses the potential for accidental spills of fuel or other hazardous materials such as hydraulic fluid, grease, or coolant (Tetra Tech, 2012). Absorbent pads are stored in a Conex box in the fuel tank area of the ore-processing/support area site and are also carried in mobile equipment and trucks.

3.6.5 Power Supply and Use

A 230 Kw Caterpillar generator currently supplies electrical power at the ore-processing site. Electrical power from this generator is principally used for powering pumps. Another 100 Kw Godwin generator is available for use as a backup. Electrical service to the Gold Room ore-processing building is currently provided by a separate 10Kw Honda generator. This generator will also provide power for the proposed shop building.

3.6.6 Solid Waste Disposal

All solid waste is disposed of in accordance with rules and regulations of the Solid Waste Management Bureau, Montana Department of Environmental Quality. Steel and other metal wastes are typically removed for recycling. Used oil is removed from the site by the owners of a mechanic shop in Deer Lodge where it is used in an oil burning heater. Inert wastes (such as wood, steel, and concrete) may occasionally be buried at the site in mined-out areas during

backfilling operations. All other wastes will be trucked to an approved county landfill or a recycler. Hazardous wastes will be transported off site by a licensed hazardous waste transport company and would not be disposed of at the site. All refuse will be properly disposed. Bear-proof containers will be installed at support facilities to hold garbage and other potential attractants. Garbage containers will be emptied weekly or more often if monitoring shows they are becoming attractive to bears.

3.6.7 Fire Protection

Fire protection will be typical of a construction project, primarily relying on fire extinguishers. Fire extinguishers are located throughout the ore-processing/support and wash plant area as well as at active mining areas, where they are mounted on posts in obvious locations (as per MSHA requirements). Fire extinguishers are carried in all trucks and mounted on all mobile equipment. In addition, Golden Rule has a 1,000 gallon water truck with mounted pumps and a spray bar. Golden Rule will require employees, contractors, and subcontractors to comply with all applicable Federal and State fire laws and regulations and shall take all reasonable measures to prevent and suppress fires within the area of operations.

3.6.8 Storm Water and Sediment Migration Control

The intent of the storm water controls is to either divert clean storm water runoff around disturbed areas or to collect runoff from disturbed areas for erosion control and sediment removal. Storm water permits will be obtained as necessary to cover construction and mining operations at the Golden Rule Project site. DEQ authorized coverage of current construction activities at the ore-processing and support facility site under a general construction permit in a notification letter dated March 13, 2008.

Sediment could be generated from non-vegetated exploration or mining areas, the ore-processing area, or access roads during periods of high rainfall or snowmelt. Sediment would be prevented from moving into area streams by maintaining BMPs consisting of berms and/or silt fences along the perimeter of the water supply pond and also along the South Pit access road. A check dam located across the south pit access would direct sediment into an infiltration basin located at the intersection of this road with the Pioneer Gulch road on the opposite side of the road from Pioneer Gulch creek.

Sediment is also generated during ore-processing and is controlled by discharging process water into a French-drain and from there into an infiltration pond at the northern end of the Processing Area.

Because both of these infiltration basins are located within the proposed permit boundaries, and because Pioneer Gulch Creek terminates at the water supply pond, no surface water streams leave the permit boundary and therefore no potential for sediment to migrate outside of the permit boundary exists.

3.7 Monitoring and Mitigation Plans

Monitoring and mitigation plans are necessary to assess baseline environmental conditions prior to disturbance and to evaluate potential environmental impacts that may result from the proposed mining and ore-processing activities. Monitoring during mining activities both verifies the effectiveness of mitigations and is required in order to identify whether mining or ore-

processing activities are impacting the environment, and therefore require operational changes and/or additional mitigation measures.

3.7.1 Air Quality

A water truck with a spray bar is used for dust control along haul roads and in mining and ore-processing areas. MSHA monitored for air quality and fugitive dust during one of its site inspections and determined that there were no problems at that time.

It is anticipated that an air quality permit will not be required for this project. However, detailed information for the two generators and a list of equipment and specifications for all other emissions sources is being compiled for submittal to DEQ's Air Quality Bureau for review and final determination of potential permitting needs. If a permit is required, it will be applied for and discussed in the Final Operating Permit Application for the proposed project.

3.7.2 Water Resources

Surface water monitoring will continue at five of the six locations shown on **Figure 5** in order to identify and evaluate potential impacts to water quality. Monitoring location PG-3 will not be monitored as it does not flow year-round. Monitoring will occur three times per year, prior to spring run-off in late April or early May, during spring high flow conditions, and fall low flow conditions. Whenever possible, monitoring will occur concurrently with active ore-processing so that data collected from locations downstream of the ore-processing area are representative of conditions having the greatest potential to influence water quality. Monitoring will consist of sample collection for laboratory analysis and flow measurement. Samples submitted for laboratory analysis will be analyzed for the parameters and at the reporting levels shown in **Table 10**. Constituents repeatedly found to be below reporting levels may be dropped from the list of monitored constituents following consultation with MDEQ.

3.7.3 Soils

Soils that will be disturbed by exploration and mining activities will first be assessed to determine the depth and volume of salvageable topsoil and subsoil. Once the suitable depths are determined, topsoil and subsoil will be stripped from all areas to be disturbed (i.e. mining areas, roads, soil stockpile areas). Salvaged topsoil and subsoil will be stockpiled separately and will be seeded with an approved seed mix to prevent weed invasion and erosion. More details of soil salvage and replacement activities are provided in Section 4.0

3.7.4 Vegetation and Weed Control

Weeds would continue to be controlled in accordance with the Powell County Vegetation Management Plan (Powell County Weed Board, 2010). This includes using appropriate chemical treatments which meet the requirements of Montana and Federal laws to prevent the establishment and spread of weeds along mine access roads, areas disturbed for exploration, mining, and processing activities, and soil stockpiles.

Weed control is currently implemented three times yearly (spring, summer and fall) employing two chemical treatment techniques: aerial spray broadcast application and mechanical foliar application. Beck Gold Creek Ranch, LLC provides aerial broadcast application of herbicide over areas adjacent to the mine through the use of a helicopter. Mine personnel employ mechanical backpack supported sprayers to apply a broadleaf herbicide chemical through a spot spray technique. Mine personnel currently spray along all project constructed roads and in project related disturbance and reclamation areas. This weed management plan will be

Table 10. Surface Water Analytical Requirements, Pioneer Gulch			
Parameter	Reporting Limit (mg/L)[1]	EPA Method No.	Max. Holding Time
Physicochemical			
Specific Conductivity	None	2310B	28 days
pH	None	150.1	Upon arrival at lab
Total Dissolved Solids	None	2340C	7 days
Total Suspended Solids	None	160.2	7 days
Hardness	None	2340B	6 months
Total Recoverable Metals			
Aluminum	0.03	200.8/200.7	6 months
Arsenic	0.003	200.8/200.7	6 months
Cadmium	0.00008	200.8/200.7	6 months
Copper	0.001	200.8/200.7	6 months
Iron	0.05	200.8/200.7	6 months
Lead	0.0005	200.8/200.7	6 months
Manganese	0.005	200.8/200.7	6 months
Mercury	0.000005	E245.7	28 days
Uranium	0.0003	E200.8	6 months
Zinc	0.01	200.8/200.7	6 months
Dissolved Metals			
Aluminum	0.03	200.8/200.7	6 months
Iron	0.05	200.8/200.7	6 months
Common Cations			
Calcium	1.0	200.8/200.7	6 months
Magnesium	1.0	200.8/200.7	6 months
Potassium	1.0	200.8/200.7	6 months
Sodium	1.0	200.8/200.7	6 months
Common Anions			
Sulfate	None	375.2	28 Days
Nutrients			
Nitrate and Nitrite as N	0.01	E353.2	28 days
Ammonia as N	0.05	A 4500 NH3 H	28 days

(1) Reporting Limits reflect MDEQ (2010 Circular DEQ-7) required reporting values.

documented in a vegetation management plan with input from and submitted to the Powell County Weed Board (Appendix D).

3.7.5 Cultural Resources

Cultural resources were surveyed in areas likely to be within the area of influence of proposed mining operations and exploration areas. One of the identified features, the historic dredge, is considered significant and was submitted to the National Historic Register. The dredge will be avoided during any proposed mine operations. Other cultural resources were identified but deemed insignificant as described in Section 2.9.

Cultural resources inventoried during previous surveys (i.e. site 24PW210 - the ghost town of Pioneer, site 24PW250 - the remains of a flume in Pioneer Gulch, and site 24PW251 - a partially collapsed barn of undetermined age) are outside of the area where expansion of mining activities is proposed and would not be disturbed.

3.7.6 Wetlands

Areas evaluated during the preliminary wetland resource survey (Section 2.11) are not located in areas where mine activity is expected to occur in association with the proposed expansion. The US Army Corps of Engineers has determined that no permitting is required for the planned mine expansion activities described in this Application. If activities will occur near wetland areas, BMPs would be instituted to prevent sediment loading to the wetlands and all activities in wetlands proper will be avoided.

3.7.7 Transportation

The proposed mine expansion would result in a staffing increase whereby 22 employees would work three 8-hour shifts per day. Assuming each employee traveled to the mine in their own vehicle, an additional 15 vehicles per day would travel to and from the site using the county road connecting the ore-processing area to Interstate 90 near Gold Creek (**Figure 1**).

Golden Rule would continue to maintain private roads used for mining operations. These roads would remain accessible to the landowner however the public may be excluded or traffic use restricted for safety reasons.

3.7.8 Geotechnical

No geotechnical stability or foundation issues have been identified on the site to date. MSHA inspected pit high walls in the South Pit mining area and although it was recommended that caution be taken in mining of this area and that particular attention be paid to bench widths and heights, no specific problems were identified, nor were any citations issued.

3.7.9 Sediment Migration

Sediment could be generated from non-vegetated exploration or mining areas, the ore-processing area, or access roads during periods of high rainfall or snowmelt. Sediment would be prevented from moving into area streams by maintaining BMPs consisting of berms and/or silt fences along the perimeter of the water supply pond and also along the South Pit access road. A check dam located across the south pit access would direct sediment into an infiltration basin located at the intersection of this road with the Pioneer Gulch road on the opposite side of the road from Pioneer Gulch creek.

Sediment is also generated during ore-processing and is controlled by discharging process water into a French-drain and from there into an infiltration pond at the northern end of the Processing Area.

Because both of these infiltration basins are located within the proposed permit boundaries, and because Pioneer Gulch Creek terminates at the water supply pond, no surface water streams leave the permit boundary and therefore no potential for sediment to migrate outside of the permit boundary exists.

A combined Storm Water Pollution Prevention Plan (SWPPP) / Spill Prevention Containment and Clean-Up (SPCC) plan for the project addresses Storm Water BMPs and monitoring requirements (Tetra Tech, 2012).

3.7.10 Hazardous Materials

Hazardous materials (fuels) are stored in DOT approved containers with secondary containment. A combined Storm Water Pollution Prevention Plan (SWPPP) / Spill Prevention Containment and Clean-Up (SPCC) plan for the project addresses the potential for accidental spills of fuel or other hazardous materials such as hydraulic fluid, grease, or coolant (Tetra Tech, 2012). The only hazardous waste on site is used motor oil which is only stored until it is removed by the owner of a local repair shop for use in an oil burning furnace. The oil is removed from the site as needed by the repair shop but the volume stored on site does not exceed 300 gallons.

3.7.11 Noise

Mining in Pioneer Gulch produces noise associated with excavation/hauling of ore, ore-processing equipment, and power generation. Noise levels have not been measured however the considerable distance between the mine and the nearest neighbor (Don Beck, the land owner, about 1.5 miles north of the ore-processing area) appears adequate to mitigate any impacts related to noise. This is supported by the mine receiving no noise related complaints during previous activities, including a period of 24-hour operation.

4.0 RECLAMATION PLAN

Reclamation is expected to be completed shortly after excavation and gravel hauling is completed at each exploration and mining area. The ore-processing area would be retained for use by the private landowner as would the steel sided buildings housing the Gold Room, jig/wash table circuits, and mechanic's shop. General reclamation activities and specific protocols for different aspects of reclamation are described below.

4.1 Reclamation Sequence

Three types of disturbances at the project site would require reclamation. These are exploration/mining areas, access roads, and the ore-processing area. The general activities to reclaim these areas are listed in the following sections.

4.1.1 Reclamation of Exploration and Mining Areas

Exploration areas deemed unfavorable for future mining activity would result in relatively small and shallow disturbance areas. The currently active South Pit Mining Area and any exploration areas that progress into the ore production phase would result in larger disturbances but would be concurrently reclaimed leaving no more than six acres of disturbance footprint at any time. The disturbed area would be reclaimed using the same general practices as those for exploration areas. Mining and exploration areas would be reclaimed using the following procedures.

1. All available soil and subsoil would be salvaged and stockpiled as an initial step prior to excavation of trenches or pits as described in more detail in Section 4.2.2. Woody debris cleared during initial site preparation work would also be retained for redistribution across the site during reclamation. Saleable timber would be sold by the ranch owner and slash piles (material in excess of that needed for reclamation) would be stockpiled and burned seasonally.

2. Exploration trenches or pits would be backfilled using excavated material and/or processed waste rock backhauled from the Processing Area. In the case of mining areas, inactive mined-out portions of the pit would be backfilled concurrently with active mining in other areas of the pit. Historic underground workings may be exposed in the process of conducting exploration or mining activities. If they are, the first 15 feet would be backfilled with sand and gravel materials (if possible depending on safety considerations) prior to reclamation of the surface area disturbance.

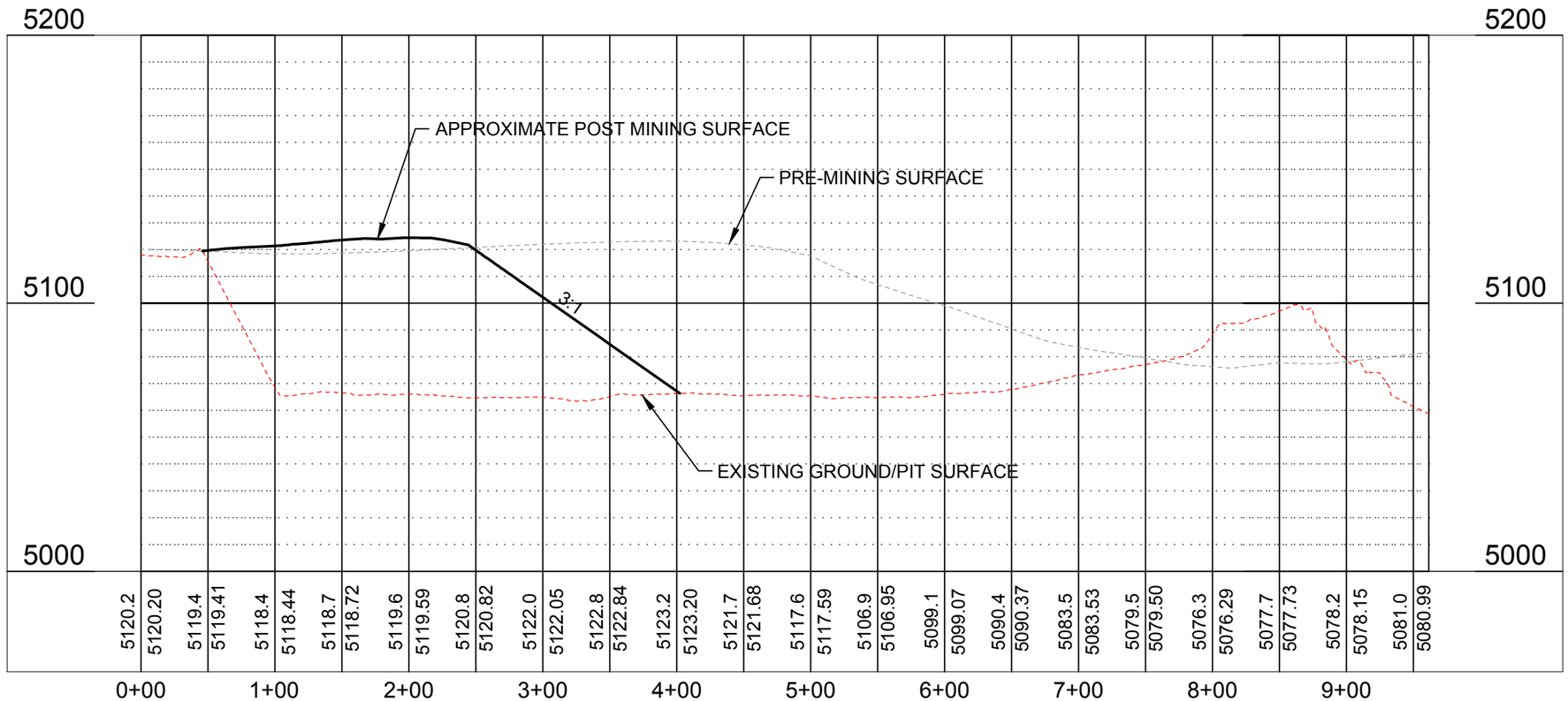
3. Surfaces would be regraded to approximate original contours and tied into adjacent undisturbed topography as shown conceptually in **Figure 16**, **Figure 17**, and **Figure 18**.

4. Any compacted surfaces resulting from equipment use would be ripped or scarified.

5. Stockpiled topsoil and subsoil would be sequentially replaced over the disturbed area followed by placement of woody debris to provide microsites for plant establishment.

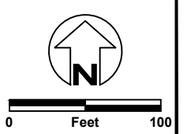
6. Disturbed areas would be revegetated with a DEQ approved seed mix.

7. All refuse from the sites would be collected and disposed of at appropriate facilities.

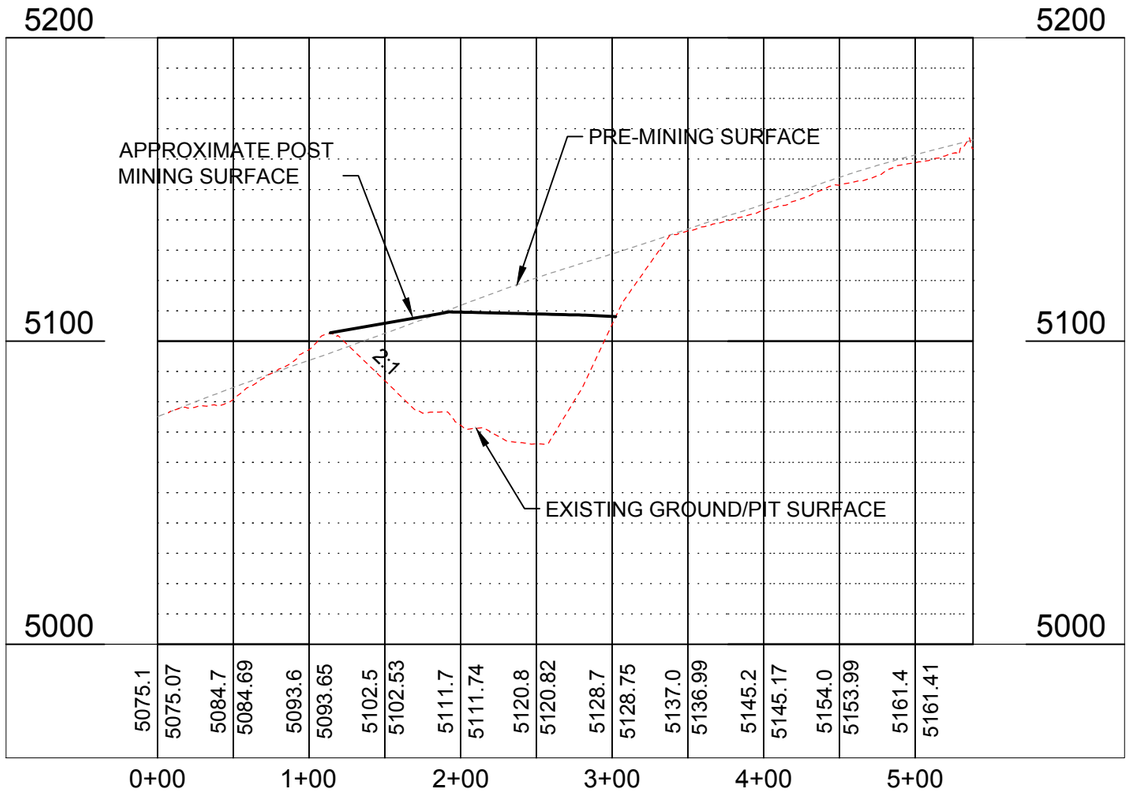


SECTION A-A'

SCALE: H 1"=100', VERT. EXAG 2x



Post Mine Topography A-A'
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 16



SECTION B-B'

SCALE: H 1"=100', VERT. EXAG 2x

N

0 Feet 100

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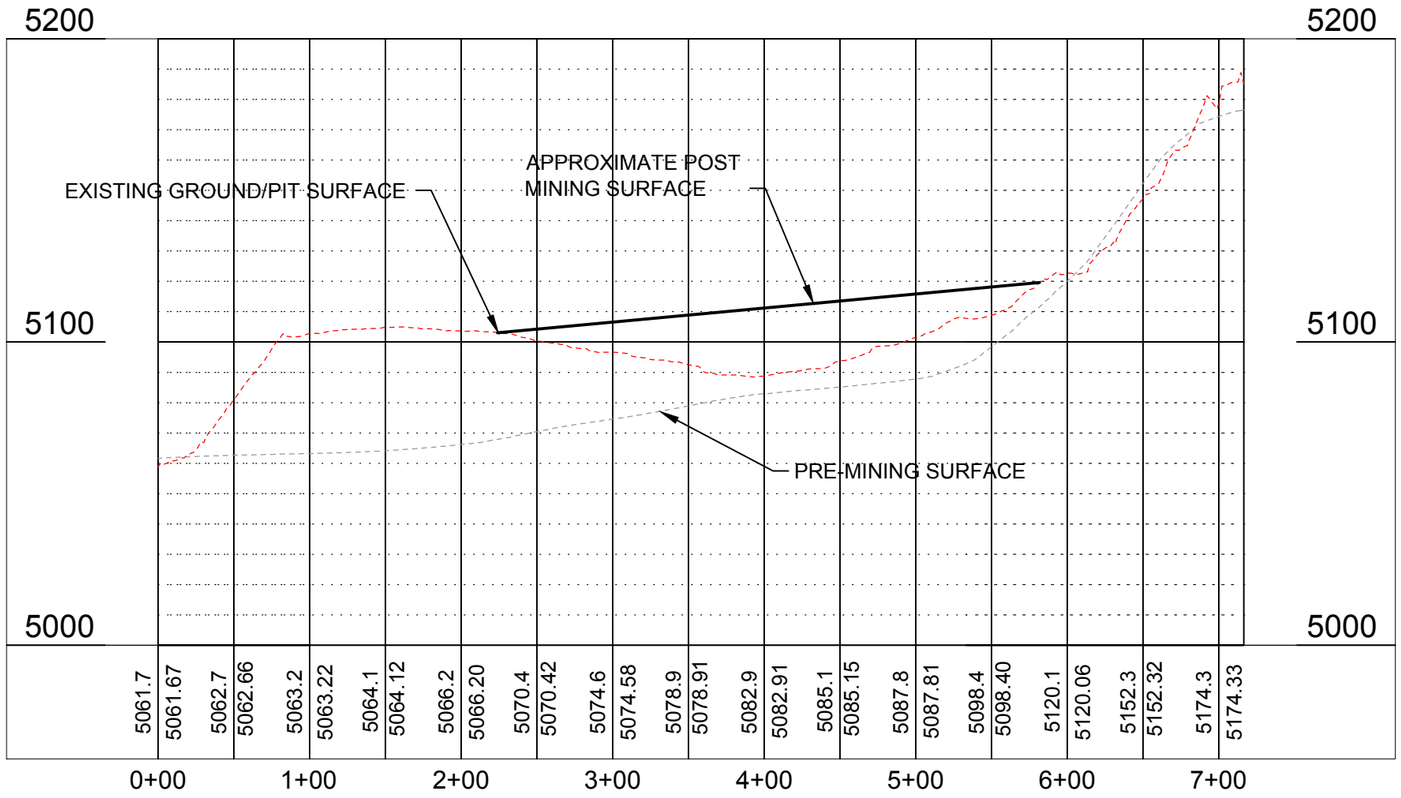
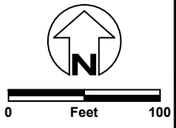
Post Mine Topography B-B'
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 17



SECTION C-C'

SCALE: H 1"=100', VERT. EXAG 2x



Post Mine Topography C-C'
Pioneer Placer Field
Gold Rule Mining Company
Gold Creek, Montana
FIGURE 18

4.1.2 Reclamation of Roads

Temporary roads may be constructed for access to new exploration areas or in perimeter areas of pit expansion. These roads would be reclaimed using the following protocols. Existing roads and Jeep trails may not be reclaimed.

1. Any compacted surfaces will be ripped or scarified.

2. Surfaces would be regraded to approximate original contours.

3. Topsoil and subsoil would be sequentially placed over disturbed area after first salvaging the soil prior to disturbance as described in more detail in Section 4.2.2.

4. Disturbed areas would be revegetated with a DEQ approved seed mix.

4.1.3 Reclamation of Ore-Processing Area and Support Facilities

The ore-processing area would be retained for use by the private landowner however it is possible that the landowner would request portions of the relatively flat regraded areas to be reclaimed. The private landowner may also request that any waste rock not used to backfill mining disturbances be left at the site for other uses.

1. All equipment except steel sided buildings and their foundations would be removed. Coarse waste rock would be hauled to the South Pit and used to backfill the pit. Fine waste rock would be used to augment growth media volumes for reclamation of both the South Pit and the ore-processing area. Some volume of waste rock may remain on site for use by the private property owner if requested. Currently there are about 30,000 cubic yards of coarse waste and 9,400 cubic yards of fine waste stored in the ore-processing area.

2. Any compacted surfaces will be ripped to alleviate compaction.

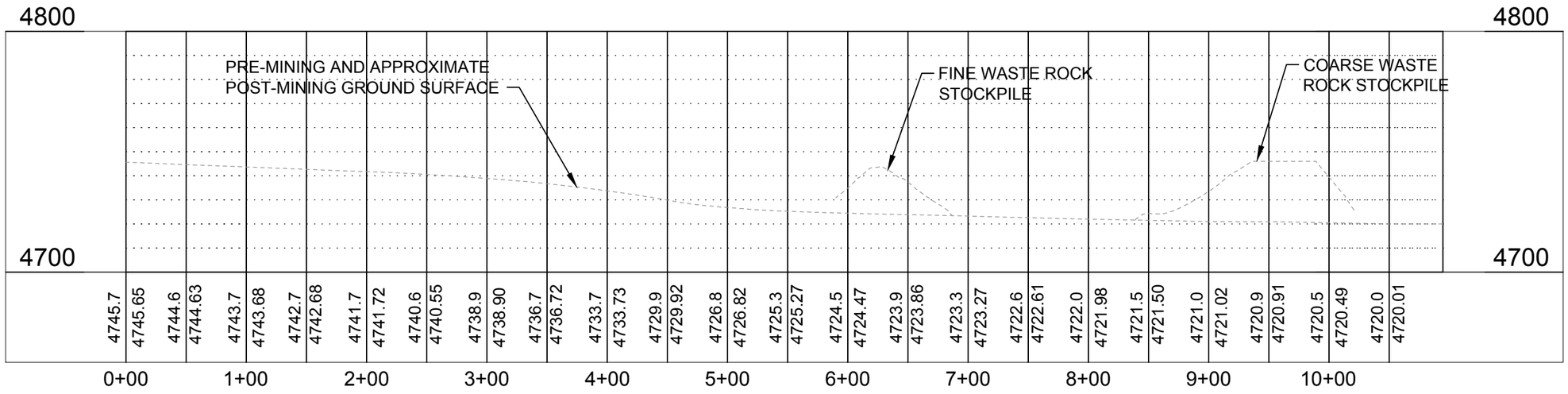
3. Surfaces would be regraded to approximate original contours as indicated in **Figure 19** and **Figure 20**.

4. In areas to be revegetated, material from the fine waste stockpile would be sequentially placed over disturbed area. If additional soil is available from salvage activities in the South Pit area, topsoil and/or subsoil could be hauled to the ore processing site to amend the fine waste material to improve the potential for reclamation success.

5. Disturbed areas would be revegetated with a DEQ approved seed mix.

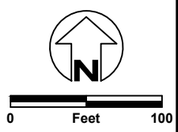
4.2 Soil Handling and Clearing

Soil salvage activities were not conducted prior to summer 2012. As a result an unknown volume of soil was buried beneath waste rock during backfill operations at the South Pit. This was remedied in summer 2012 and approximately 1,000 cubic yards of soil are currently stockpiled at the pit. In order to provide an adequate thickness of growth media to reclaim the current disturbance, Golden Rule has also segregated and stockpiled fine waste rock sands during it ore processing activities. This material supports reseeded vegetation in areas where it



SECTION D-D'

SCALE: H 1"=100', VERT. EXAG 2x



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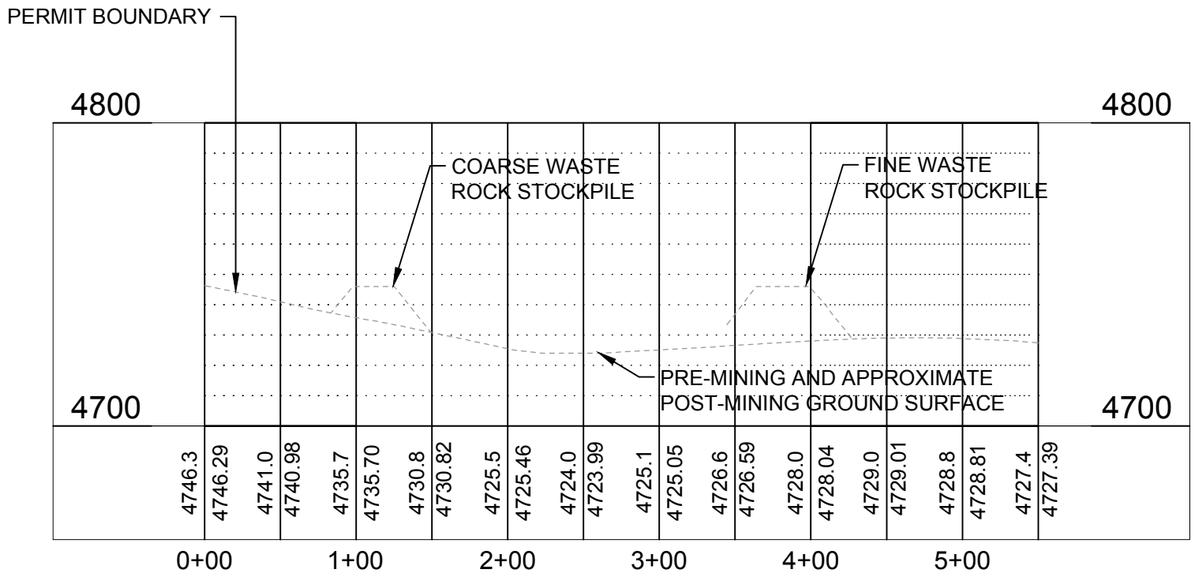
Post Mine Topography D-D'
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 19



SECTION E-E'

SCALE: H 1"=100', VERT. EXAG 2x

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Post Mine Topography E-E'
Pioneer Placer Field
Golden Rule Mining Company
Gold Creek, Montana
FIGURE 20

was used to reclaim exploration disturbances and along the margins of the ore processing area. A fine waste stockpile of approximately 9,400 cubic yards is currently available for reclamation (**Figure 11**). This volume of combined soil and fine waste should be adequate to reclaim the current pit disturbance with an approximate 1.2-foot thickness of growth media.

As mining progresses reclamation would be concurrent with exploration and mining work. The following discussion of soil handling methods applies to the currently approved operation and Golden Rule would continue to use these methods during the proposed exploration or mining area expansion.

4.2.1 Vegetation Management, Removal and Disposition

Disturbance would be minimized during clearing and excavation activities. In the event that timber must be cleared, boundaries would be clearly marked. Where necessary for operations, timber from exploration and mining areas will be harvested and removed by contract loggers working for the ranch owner. Non-commercial timber and slash from timber clearing operations would be salvaged for use in soil protection wherever possible. Large or whole pieces may be used as physical barriers and catchments below slopes created by backfilling of mined out areas or for placement along access road fill slopes. Alternatively, excess slash may be piled and burned during winter months.

4.2.2 Soil Salvage

All available topsoil/subsoil or growth medium would be removed prior to commencing excavation activities. It is expected that soil thickness will vary considerably throughout the proposed disturbance area. Soil would be stripped in two lifts and stockpiled in separate piles (topsoil and subsoil) based on visual observation of the interface between dark colored organic-rich topsoil and lighter colored subsoil. The salvage depth of subsoil would be determined similarly based the visible interface of the weathered soil with the non-weathered alluvial gravels below. Based on soil survey data (Appendix C) it is expected that the upper 10 to 15 inches of the soil profile would be salvaged as topsoil. Subsoil would be salvaged to a depth of approximately 32 inches in areas where soil mapping units 41C and 41D are present and to a depth of approximately 20 inches in other areas. Below these depths soils are not suitable for reclamation due to extremely high gravel and/or clay content.

These anticipated stripping depths would result in a total of approximately 32,000 additional cubic yards of topsoil and 51,000 additional cubic yards of subsoil salvaged and stockpiled during mining of the South Pit, depending in the ultimate configuration of the excavation over the next five years. A minor additional volume soil would also be salvaged and stockpiled prior to exploration/road disturbance as needed.

Salvaged soil material will be stockpiled adjacent to the exploration and mining areas from which it is stripped and near the area where it will ultimately be replaced during reclamation (**Figure 11**). The stockpiles will be revegetated using an approved seed mixture to reduce erosion, soil loss from wind, and weed invasion. Seeding will occur as soon as possible after stockpiling to minimize the potential for noxious weed invasion.

Large volumes of soil stockpiled for a prolonged period of time (i.e. for reclamation of mining areas) would be incrementally stabilized to minimize erosion and loss of soil. The stockpile surface would be loosened if necessary to provide a proper seedbed. Broadcast seeding will be conducted during the first appropriate season following stockpiling. Fertilizer and mulch will be applied to the piles as necessary to optimize revegetation efforts.

4.2.3 Soil Redistribution

Prior to soil redistribution, compacted areas such as the ore-processing area, access roads, and backfilled areas that have been subjected to equipment use will be ripped to relieve compaction. This will also eliminate potential slippage along layered contacts and promote a hospitable root development zone. Soil materials will be applied in lifts as thick as possible and ripped after placement to decrease compaction. All soil salvaged from an exploration or mining area will be used to reclaim that same area unless additional soil is available and needed to successfully reclaim other areas. Where salvage soil is limited fine waste rock, which has been successfully used on site as a suitable growth medium, will be employed. It is anticipated that a minimum thickness of 6 inches of subsoil and 10 inches of topsoil would be placed during reclamation of disturbed areas.

4.3 Revegetation

Revegetation of all reclaimed areas as well as temporary vegetative cover on soils stockpiles would use DEQ approved seed mix shown in **Table 11**. This seed mix would be broadcast seeded across all area requiring revegetation.

Seedbed preparation will be conducted immediately after grading and soil placement. Seed and mulch will be applied to fresh road cuts and fills as soon after construction as possible to ensure coverage by natural sloughing.

Treatments which will be practiced to ensure successful revegetation include scarifying to prepare the surface for soil placement, fertilizing, mulching and placement of woody debris for erosion control and aesthetics. When necessary, ripping will be conducted prior to soil application to reduce compaction prior to seeding.

Table 11. Seed Mix Approved for Reclamation Activities

Common Name	Scientific Name	Pounds PLS / Acre[1]
Bluebunch Wheatgrass	*Pseudoroegneria spicata*	6.0
Slender Wheatgrass	*Elymus trachycaulus*	5.5
Streambank Wheatgrass	*Agropyron riparian*	5.5
Idaho Fescue	*Festuca idahoensis*	1.5
Big Bluegrass	*Poa ampla*	0.2
Annual Ryegrass	*Lolium perenne*	2.0
	Total	20.7

[1] PLS = Pure Live Seed

The decision to supplement revegetated areas with fertilizer will be based on soil tests conducted in the event that revegetation is not successful during the first growing season following seed application.

Weed control would be conducted on revegetated areas in accordance with the current weed control methods described in Section 3.7.4.

4.4 Post Operation Land Use

Post operation land use at the site will be primarily wildlife habitat or grazing. The private roads will remain for landowner access. Cattle grazing will continue to occur. The regraded ore-processing area along with the existing buildings which house the jig/wash table circuits, Gold Room, and mechanic's shop will remain for use by the private landowner. The water supply ponds will remain although an overflow culvert will be added to the lower water supply pond to allow water to safely overflow the dam and infiltrate into the ground below the dam if necessary.

4.5 Post-Operation Solid Waste Disposal

After mining work is completed, the buildings which house the jig/wash table circuits, Gold Room, and mechanic's shop will remain for use by the private landowner while other equipment and infrastructure (e.g. the trommel, jigs/wash tables, etc) will be dismantled and removed. Following removal and salvage of facilities, any remaining solid waste will be disposed of in accordance with laws and regulations of the Montana Solid Waste Management Bureau and Powell County. Inert waste such as concrete, plastic or wood may be buried on-site or sold to scrap dealers for recycling; some waste may be transported to an approved waste transfer station as authorized by the county solid waste district. Any exposed rebar in concrete would be cut flush with the concrete surface prior to burial.

4.6 Reclamation Monitoring

Reclamation monitoring will consist of annual inspections to evaluate the success of revegetation and the proper function of erosion control measures.

Monitoring will occur during the growing season to identify areas where vegetation may be failing and the cause of the failure will be determined. Visual inspections will be conducted to identify areas that have inadequate cover, poor seedling growth, erosional damage, or obvious nutritional deficiencies. If the cause appears to be related to soil infertility or toxicity, a soil testing program will be implemented. Tests would be conducted to ascertain macro- and micronutrient status, and soil pH. Appropriate remedial actions will be taken to correct any problem.

Erosion monitoring will consist of inspection of run-on and run-off diversions, berms, and other features constructed to prevent sediment migration from roads, reclaimed areas, and the ore-processing area. If erosion controls and established BMPs are found to be inadequate or damaged, they will be repaired as necessary.

A report will be submitted annually describing monitoring results, discussing reclamation problems and identifying remedial measures taken. Application for reclamation bond releases will be made in two stages: one upon completion of regrading activities and again once successful revegetation has been established to the satisfaction of DEQ.

5.0 OTHER FORESEEABLE ACTIONS

Exploration and incorporation of more efficient processing equipment have made the Squaw Gulch and the Gravel Pit exploration areas (**Figure 1**) highly prospective for future gold mining operations. Mining of these areas is not proposed in this Application although some additional work may occur under Golden Rule's Exploration Permits. If the decision is made to expand mining operations into the Squaw Gulch and Gravel Pit areas a formal request including detailed mining plans for each area will be made in an Amendment(s) to this Operating Permit Application once it is approved. Current status and work that is anticipated to occur if mining would be conducted at each of these two areas is summarized below.

Exploration activity at the Squaw Gulch exploration target area has been completed. The surface disturbance area (0.01 acres) is currently bermed to provide a safe temporary closure and erosion control. If open-pit mining were to occur in Squaw Gulch it is expected to have a 3 to 5 year mine life and is expected to occur over an area of about five acres. Golden Rule believes that mining in this area would be most effective if an ore-processing area was established near or adjacent to any potential open-pit rather than hauling materials to the existing processing area. This would likely require installation of water supply well and holding pond to provide an adequate supply of water to operate the new ore-processing equipment. The same general process and equipment used to wash placer gravels at the currently operative ore-processing area would likely be used at Squaw Gulch. Reclamation of any proposed disturbance would be as described above.

The Gravel Pit exploration area is located in and near an existing gravel pit excavated into historic placer spoils. Modern placer processing equipment is able to recover fine gold that was not economically recoverable using equipment available when this area was first mined. If exploration of this area indicates favorable conditions for mining, Golden Rule would likely relocate ore-processing equipment from the existing processing area to the gravel pit. Gravel production would continue using the ore-processing equipment to recover gold from the gravels as they are washed. Water would likely be supplied by excavating a sump into the base of the gravel pit to access shallow groundwater within the historic placer spoils. Washed and screened gravel from gold recovery in the pit may be stockpiled for proposed resale.

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Appendix A. SURFACE WATER AND SEDIMENT ANALYTICAL DATA

Pioneer Placer H20 Monitoring Data

Site ID	Date	Flow Rate	Temp	pH Field	pH Lab	SC Field	SC Lab	Acidity, Total as CaCO3	Aluminum (TRC)	Aluminum (Dissolved)	Antimony	Arsenic	Barium	Beryllium	Bicarbonate as HCO3	Cadmium	Calcium	Carbonate as CO3	Chloride	Chromium	Copper	Hardness as CaCO3
		GPM	(deg C)	(S.U.)	(S.U.)	(umhos/cm)	(umhos/cm)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MT Aquatic Life Standard1,2						---	---	---	0.000	0.087	---	0.15	---	---	---	0.00037 h	---	---	230*	0.12 h	0.013 h	---
MT Human Health Standard for Surface Water				6.5 to 8.5		---	---	---	---		0.0056	0.01	2	0.004	---	0.005	---	---		0.10	1.3	---
MT Groundwater Standard3						---	---	---	---		0.006	0.01	2	0.004	---	0.005	---	---	250 s*	0.10	1.3	---
															---							
SG-1	6/28/2011	10 to 20	--	--	7.2	--	320	22	<0.05	--	<0.005	<0.005	<0.1	<0.001	237	<0.0001	46	<4	2	<0.01	<0.001	142
SG-1	9/23/2011	186	6.6	7.05	7.4	195	309	<4	0.1	--	<0.003	<0.003	0.042	<0.001	189	<0.00008	46	<4	2	0.002	<0.001	145
SG-1	5/16/2012	71	10.1	7.45	7.8	296	315	<4	<0.03	<0.03	<0.003	0.003	0.039	<0.001	190	<0.00008	<50	<4	<2	<0.001	0.003	147
SG-1	7/10/2012	63	11.3	7.27	7.6	314	333	NM	0.14	<0.03	NM	0.003	NM	NM	NM	<0.00008	46	NM	NM	NM	0.001	143
PG-1	6/28/2011	198	13.3	8.57	8.3	374	406	<4	0.33	--	<0.005	<0.005	<0.1	<0.001	251	<0.0001	76	7	1	<0.01	<0.002	218
PG-1	9/23/2011	9	8.3	8.37	8.3	249	371	<4	2.02	--	<0.003	<0.003	0.051	<0.001	242	0.00011	70	6	<1	0.003	0.003	205
PG-1	5/16/2012	24	15	8.87	8.5	359	386	<4	0.63	<0.03	<0.003	<0.003	0.039	<0.001	240	<0.00008	76	8	<1	0.002	0.003	205
PG-1	7/10/2012	3	18.5	8.21	8.4	341	396	NM	0.89	<0.03	NM	<0.003	NM	NM	NM	<0.00008	73	NM	NM	NM	0.002	210
PG-2	6/28/2011	378	11.2	7.46	8.0	335	365	<4	0.07	--	<0.005	<0.005	<0.1	<0.001	234	<0.0001	63	<4	1	<0.01	<0.002	186
PG-2	9/23/2011	23	11.0	8.26	8.2	268	372	<4	0.14	--	<0.003	<0.003	0.046	<0.001	242	<0.00008	69	5	<1	0.001	<0.001	203
PG-2	5/16/2012	126	11.5	8.85	8.3	340	361	<4	0.04	<0.03	<0.003	<0.003	0.038	<0.001	244	<0.00008	69	<4	1	<0.001	0.002	202
PG-2	7/10/2012	30	16.1	7.61	8.0	362	388	NM	0.1	<0.03	NM	<0.003	NM	NM	NM	<0.00008	66	NM	NM	NM	<0.001	194
SG-2	6/28/2011	375	12.6	7.82	7.8	302	336	<4	4.24	--	<0.005	<0.005	<0.1	<0.001	199	<0.0001	49	<4	1	<0.01	0.006	149
SG-2	9/23/2011	152	10.7	8.12	8.1	261	363	<4	0.15	--	<0.003	<0.003	0.032	<0.001	228	<0.00008	61	<4	1	0.001	<0.001	186
SG-2	5/16/2012	320	10.7	8.2	8.0	327	346	<4	0.15	<0.03	<0.003	<0.003	0.029	<0.001	204	<0.00008	58	<4	1	<0.001	0.002	169
SG-2	7/10/2012	70	15.3	7.83	8.1	348	368	NM	0.21	<0.03	NM	<0.003	NM	NM	NM	<0.00008	59	NM	NM	NM	<0.001	176
SP-3	6/28/2011	<5	23.2	7.97	7.6	349	387	<4	7.34	--	<0.005	0.006	0.1	<0.001	209	0.0002	59	<4	2	<0.01	0.01	183
SP-3	9/23/2011	0	21.5	8.22	8.3	292	313	<4	<0.03	--	<0.003	<0.003	0.032	<0.001	186	<0.00008	46	<4	2	<0.001	<0.001	153
SP-3	5/16/2012	0	19.5	8.42	8.3	353	374	<4	0.22	<0.03	<0.003	<0.003	0.044	<0.001	203	0.00009	60	<4	2	0.001	0.002	185
SP-3	7/10/2012	400	16.4	7.85	8.2	314	353	NM	25.5	<0.03	NM	0.024	NM	NM	NM	0.00049	52	NM	NM	NM	0.025	163
PG-3	6/28/2011	--	18.7	7.87	7.5	261	311	<4	<0.05	--	<0.005	<0.005	<0.1	<0.001	173	<0.0001	50	<4	<1	<0.01	<0.001	145
PG-3	9/23/2011	No Flow	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PG-3B	9/23/2011	450	14.7	8.17	8.2	325	377	<4	0.05	--	<0.003	0.004	0.034	<0.001	202	<0.00008	64	<4	1	<0.001	<0.001	191
PG-3B	5/16/2012	4017	11.7	8.06	8.0	275	294	<4	0.03	<0.03	<0.003	0.003	0.026	<0.001	154	<0.00008	51	<4	<1	0.001	0.002	139
PG-3B	7/10/2012	1629	11.7	8.06	8.1	275	341	NM	0.03	<0.03	NM	0.004	NM	NM	NM	<0.00008	54	NM	NM	NM	<0.001	158

All metals data are total recoverable concentrations (TRC) unless otherwise noted for aluminum and iron.

1: MT Aquatic Life Standards apply to total recoverable digestion methods for surface waters except for aluminum which is based on dissolved concentration.

2: Hardness dependent standards (h) calculated for hardness of 150 mg/L based on Aug 2010 DEQ-7.

3: Groundwater Standards apply to dissolved portion of sample for ground waters.

s = secondary standard; h = hardness dependent (for this table, values presented are based on a hardness of 150 mg/L).

* = federal U.S. EPA standard. --- = no standard or not analyzed.

Shading indicates exceedence of corrosponding standard.

All metal concentraitons are total recoverable

Pioneer Placer H20 Monitoring Data

Site ID	Date	Iron (TRC)	Iron (Dissolved)	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Solids, Total Dissolved TDS @ 180 C	Solids, Total Suspended TSS @ 105 C	Strontium	Sulfate	Thallium	Uranium	Zinc
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
MT Aquatic Life Standar		1.0	---	0.0053 h	---	---	0.00091	0.0753 h	---	0.005	0.00815 h	---	---	---	---	---	---	---	0.169 h
MT Human Health Stand		0.3 s	---	0.015	---	0.05 s	0.00005	0.1	---	0.05	0.1	---	---	---	---	---	0.0017	0.02	2.0
MT Groundwater Standa		0.3 s	---	0.015	---	0.05 s	0.0020	0.1	---	0.05	0.1	---	---	---	4.0	250 s*	0.002	0.03	2.0
SG-1	6/28/2011	0.03	--	<0.001	7	<0.003	<0.0001	<0.01	4	<0.005	<0.005	9	208	<10	0.3	8	<0.005	0.006	<0.01
SG-1	9/23/2011	0.22	--	<0.0005	7	<0.005	<0.000005	<0.01	5	<0.001	<0.001	9	223	<10	0.3	9	<0.0002	0.0063	<0.01
SG-1	5/16/2012	<0.05	--	<0.0005	7	<0.005	<0.000005	<0.01	5	<0.001	<0.0005	10	212	13	0.3	9	<0.0002	0.0063	<0.01
SG-1	7/10/2012	0.17	<0.05	<0.0005	7	0.024	<0.000005	NM	7	NM	NM	9	197	20	NM	9	NM	0.0069	<0.01
PG-1	6/28/2011	0.24	--	<0.001	7	0.011	<0.0001	<0.01	2	<0.005	<0.005	3	256	12	0.1	7	<0.005	0.001	<0.01
PG-1	9/23/2011	1.68	--	0.002	7	0.111	0.000011	<0.01	2	<0.001	<0.0005	4	246	33	0.2	5	<0.0002	0.0016	0.01
PG-1	5/16/2012	0.51	--	0.0007	7	0.034	0.000006	<0.01	2	<0.001	<0.0005	3	254	32	0.1	6	<0.0002	0.0017	<0.01
PG-1	7/10/2012	0.69	<0.05	0.0009	7	0.035	<0.000005	NM	2	NM	NM	3	219	51	NM	5	NM	0.0015	<0.01
PG-2	6/28/2011	0.18	--	<0.001	7	<0.003	<0.0001	<0.01	2	<0.005	<0.005	3	214	<10	0.2	6	<0.005	0.001	<0.01
PG-2	9/23/2011	0.13	--	<0.0005	8	<0.005	<0.000005	<0.01	2	<0.001	<0.0005	4	251	<10	0.2	6	<0.0002	0.0015	<0.01
PG-2	5/16/2012	<0.05	--	<0.0005	7	<0.005	<0.000005	<0.01	2	<0.001	<0.0005	4	206	<10	0.2	6	<0.0002	0.0016	<0.01
PG-2	7/10/2012	0.13	<0.05	0.0006	7	0.015	0.000018	NM	4	NM	NM	4	223	50	NM	6	NM	0.0016	<0.01
SG-2	6/28/2011	3.66	--	0.002	6	0.085	<0.0001	<0.01	3	<0.005	<0.005	8	221	77	0.2	12	<0.005	0.002	0.02
SG-2	9/23/2011	0.14	--	<0.0005	8	0.012	<0.000005	<0.01	2	<0.001	<0.0005	9	237	<10	0.2	12	<0.0002	0.0035	<0.01
SG-2	5/16/2012	0.17	--	<0.0005	7	0.021	<0.000005	<0.01	2	<0.001	<0.0005	11	212	<10	0.2	17	<0.0002	0.003	<0.01
SG-2	7/10/2012	0.28	<0.05	<0.0005	7	0.056	<0.000005	NM	2	NM	NM	8	213	<10	NM	12	NM	0.0032	<0.01
SP-3	6/28/2011	6.56	--	0.004	9	0.429	<0.0001	<0.01	7	<0.005	<0.005	9	279	119	0.3	26	<0.005	0.002	0.03
SP-3	9/23/2011	<0.05	--	<0.0005	9	<0.005	0.000007	<0.01	3	0.001	<0.0005	10	216	<10	0.2	16	<0.0002	0.0051	<0.01
SP-3	5/16/2012	0.23	--	<0.0005	10	0.290	<0.000005	<0.01	3	<0.001	<0.0005	10	228	<10	0.3	32	<0.0002	0.0047	<0.01
SP-3	7/10/2012	39.4	<0.05	0.0164	8	1.160	0.000022	NM	3	NM	NM	9	204	651	NM	12	NM	0.0057	0.08
PG-3	6/28/2011	0.14	--	<0.001	5	0.008	<0.0001	<0.01	3	<0.005	<0.005	5	187	<10	0.2	17	<0.005	0.001	<0.01
PG-3	9/23/2011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PG-3B	9/23/2011	<0.05	--	<0.0005	7	<0.005	<0.000005	<0.01	4	<0.001	<0.0005	9	253	<10	0.3	40	<0.0002	0.0023	<0.01
PG-3B	5/16/2012	<0.05	--	<0.0005	5	<0.005	<0.000005	<0.01	4	<0.001	<0.0005	6	192	<10	0.2	26	<0.0002	0.0013	<0.01
PG-3B	7/10/2012	<0.05	<0.05	<0.0005	6	<0.005	<0.000005	NM	3	NM	NM	6	222	16	NM	29	NM	0.0014	<0.01

All metals data are total recoverable concentrations (TRC) unless otherwise noted for aluminum and iron.

1: MT Aquatic Life Standards apply to total recoverable digestion methods for surface waters except for aluminum which is based on dissolved concentration.

2: Hardness dependent standards (h) calculated for hardness of 150 mg/L based on Aug 2010 DEQ-7.

3: Groundwater Standards apply to dissolved portion of sample for ground waters.

s = secondary standard; h = hardness dependent (for this table, values presented are based on a hardness of 150 mg/L).

* = federal U.S. EPA standard. --- = no standard or not analyzed.

Shading indicates exceedence of corrosponding standard.

All metal concentraitons are total recoverable

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Tetra Tech
Project: Pioneer Placer
Lab ID: B11063207-006
Client Sample ID SP-3 Soil

Report Date: 07/14/11
Collection Date: 06/28/11 16:25
DateReceived: 06/29/11
Matrix: Soil

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL - EPA SW846							
Mercury	ND	mg/kg		1		SW7471A	07/07/11 14:49 / jlw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Tetra Tech
Project: Pioneer Gulch 114-710302-200
Lab ID: B12070974-008
Client Sample ID PG-1 SED

Report Date: 07/31/12
Collection Date: 07/10/12 15:40
DateReceived: 07/12/12
Matrix: Solid

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL - EPA SW846							
Mercury	ND	mg/kg		1		SW7471A	07/23/12 15:28 / jlw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Tetra Tech
Project: Pioneer Gulch 114-710302-200
Lab ID: B12070974-009
Client Sample ID SP-3 SED

Report Date: 07/31/12
Collection Date: 07/10/12 13:35
DateReceived: 07/12/12
Matrix: Solid

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL - EPA SW846							
Mercury	ND	mg/kg		1		SW7471A	07/23/12 15:30 / jlw

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

Appendix B. GROUNDWATER ANALYTICAL DATA

Ground-Water Information Center Water Quality Report

Site Name: CUNNINGHAM RON

Report Date: 2/23/2012

Compare to Water Quality Standards

Location Information

Sample Id/Site Id:	1985Q1225 / 5513	Sample Date:	11/6/1985 1:30:00 PM
Location (TRS):	09N 11W 21 ACCC	Agency/Sampler:	USGS / KAD
Latitude/Longitude:	46° 31' 14" N 112° 59' 3" W	Field Number:	DL283
Datum:	NAD27	Lab Date:	12/26/1985
Altitude:	4878	Lab/Analyst:	MBMG / WO
County/State:	POWELL / MT	Sample Method/Handling:	/ 3120
Site Type:	WELL	Procedure Type:	DISSOLVED
Geology:	120SDMS	Total Depth (ft):	77
USGS 7.5' Quad:	GARRISON 15'	SWL-MP (ft):	NR
PWS Id:		Depth Water Enters (ft):	NR
Project:			

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	41.800	2.086	Bicarbonate (HCO3)	141.000	2.311
Magnesium (Mg)	6.600	0.543	Carbonate (CO3)	0.000	0.000
Sodium (Na)	2.700	0.117	Chloride (Cl)	0.500	0.014
Potassium (K)	1.300	0.033	Sulfate (SO4)	17.800	0.371
Iron (Fe)	<.002	0.000	Nitrate (as N)	0.030	0.002
Manganese (Mn)	<.001	0.000	Fluoride (F)	0.100	0.005
Silica (SiO2)	14.500		Orthophosphate (as P)	0.100	0.003
Total Cations		2.787	**Total Anions**		2.706

Trace Element Results (µg/L)

Aluminum (Al):	<30.	Cesium (Cs):	NR	Molybdenum (Mo):	<20.	Strontium (Sr):	160.000
Antimony (Sb):	NR	Chromium (Cr):	<2.	Nickel (Ni):	<10.	Thallium (Tl):	NR
Arsenic (As):	0.300	Cobalt (Co):	NR	Niobium (Nb):	NR	Thorium (Th):	NR
Barium (Ba):	NR	Copper (Cu):	<2.	Neodymium (Nd):	NR	Tin (Sn):	NR
Beryllium (Be):	NR	Gallium (Ga):	NR	Palladium (Pd):	NR	Titanium (Ti):	1.000
Boron (B):	30.000	Lanthanum (La):	NR	Praseodymium (Pr):	NR	Tungsten (W):	NR
Bromide (Br):	<100.	Lead (Pb):	NR	Rubidium (Rb):	NR	Uranium (U):	NR
Cadmium (Cd):	<2.	Lithium (Li):	<2.	Silver (Ag):	<2.	Vanadium (V):	<1.
Cerium (Ce):	NR	Mercury (Hg):	NR	Selenium (Se):	0.100	Zinc (Zn):	15.000
						Zirconium (Zr):	<4.

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L):	155.870	Field Hardness as CaCO3 (mg/L):	NR	Ammonia (mg/L):	NR
**Sum of Diss. Constituents (mg/L):	227.410	Hardness as CaCO3:	131.540	T.P. Hydrocarbons (µg/L):	NR
Field Conductivity (µmhos):	251	Field Alkalinity as CaCO3 (mg/L):	121	PCP (µg/L):	NR
Lab Conductivity (µmhos):	269	Alkalinity as CaCO3 (mg/L):	115.64	Phosphate, TD (mg/L as P):	NR
Field pH:	7.48	Ryznar Stability Index:	8.921	Field Nitrate (mg/L):	NR
Lab pH:	6.61	Sodium Adsorption Ratio:	0.114	Field Dissolved O2 (mg/L):	NR
Water Temp (°C):	7	Langlier Saturation Index:	-1.156	Field Chloride (mg/L):	NR
Air Temp (°C):	7.5	Nitrite (mg/L as N):	NR	Field Redox (mV):	NR
Nitrate + Nitrite (mg/L as N)	NR	Hydroxide (mg/L as OH):	NR	Lab, Dissolved Organic Carbon (mg/L):	NR
Total Kjeldahl Nitrogen (mg/L as N)	NR	Lab, Dissolved Inorganic Carbon (mg/L):	NR	Lab, Total Organic Carbon (mg/L):	NR
Total Nitrogen (mg/L as N)	NR	Acidity to 4.5	NR	Acidity to 8.3	NR
As(III) (ug/L)	NR	As(V) (ug/L)	NR		

Additional Parameters

Alkalinity Fld (CaCO3)	121.000	Alk F.Endpoint(Fld-mg/L)	122.000	Bicarbonate Field (Hco3)	148.000
Carbonate Field (Co3)	0.000	Phosphate T Dis (mg/L - P)	L.1		

Notes

Sample Condition: CLEAR FEW AIR BUBBLES NO ODOR * SLIGHT RUST STAIN AND RUST SEDIMENT SEDIMENT ON FILTER *

Field Remarks: SEND COPY TO: RON CUNNINGHAM BOX 16 GOLDCREEK MT 59733

Lab Remarks:

Explanation: **mg/L** = milligrams per Liter; **µg/L** = micrograms per Liter; **ft** = feet; **NR** = No Reading in GWIC

Qualifiers: **A** = Hydride atomic absorption; **E** = Estimated due to interference; **H** = Exceeded holding time; **J** = Estimated quantity above detection limit but below reporting limit; **K** = Na+K combined; **N** = Spiked sample recovery not within control limits; **P** = Preserved sample; **S** = Method of standard additions; **U** = Undetected quantity below detection limit; ***** = Duplicate analysis not within control limits;

** = Sum of Dissolved Constituents is the sum of major cations (Na, Ca, K, Mg, Mn, Fe) and anions (HCO3, CO3, SO4, Cl, SiO2, NO3, F) in mg/L. Total Dissolved Solids is reported as equivalent weight of evaporation residue.

Ground-Water Information Center Water Quality Report

Site Name: PIERCE HOWARD

Report Date: 2/23/2012

Compare to Water Quality Standards

Location Information

Sample Id/Site Id:	2002Q0615 / 59354	Sample Date:	11/15/2001 12:35:00 PM
Location (TRS):	09N 11W 16 ABBA	Agency/Sampler:	MBMG / MGR
Latitude/Longitude:	46° 32' 26" N 112° 58' 59" W	Field Number:	59354
Datum:	NAD27	Lab Date:	2/18/2002
Altitude:	4700	Lab/Analyst:	MBMG / JMC
County/State:	POWELL / MT	Sample Method/Handling:	PUMPED / 6230
Site Type:	WELL	Procedure Type:	DISSOLVED
Geology:	217SDMS	Total Depth (ft):	60
USGS 7.5' Quad:	GRIFFIN CREEK	SWL-MP (ft):	19.26
PWS Id:		Depth Water Enters (ft):	50
Project:	GWCP05		

Major Ion Results

	mg/L	meq/L		mg/L	meq/L
Calcium (Ca)	272.000	13.573	Bicarbonate (HCO3)	172.020	2.819
Magnesium (Mg)	35.600	2.930	Carbonate (CO3)	0.000	0.000
Sodium (Na)	61.000	2.654	Chloride (Cl)	9.450	0.267
Potassium (K)	17.500	0.448	Sulfate (SO4)	856.000	17.830
Iron (Fe)	3.240	0.116	Nitrate (as N)	<.5 P	0.000
Manganese (Mn)	2.110	0.077	Fluoride (F)	<.5	0.000
Silica (SiO2)	57.900		Orthophosphate (as P)	<.5	0.000
	Total Cations	19.825		**Total Anions**	20.916

Trace Element Results (µg/L)

Aluminum (Al):	<30	Cesium (Cs):	NR	Molybdenum (Mo):	<10	Strontium (Sr):	1,090.000
Antimony (Sb):	<2	Chromium (Cr):	<2	Nickel (Ni):	15.400	Thallium (Tl):	<5
Arsenic (As):	<1	Cobalt (Co):	<2	Niobium (Nb):	NR	Thorium (Th):	NR
Barium (Ba):	42.000	Copper (Cu):	<2	Neodymium (Nd):	NR	Tin (Sn):	NR
Beryllium (Be):	<2	Gallium (Ga):	NR	Palladium (Pd):	NR	Titanium (Ti):	<1
Boron (B):	34.900	Lanthanum (La):	NR	Praseodymium (Pr):	NR	Tungsten (W):	NR
Bromide (Br):	<500	Lead (Pb):	<2	Rubidium (Rb):	NR	Uranium (U):	<.5
Cadmium (Cd):	<2	Lithium (Li):	162.000	Silver (Ag):	<1	Vanadium (V):	<5
Cerium (Ce):	NR	Mercury (Hg):	NR	Selenium (Se):	<1	Zinc (Zn):	8.040
						Zirconium (Zr):	<2

Field Chemistry and Other Analytical Results

**Total Dissolved Solids (mg/L):	1,399.340	Field Hardness as CaCO3 (mg/L):	NR	Ammonia (mg/L):	NR
**Sum of Diss. Constituents (mg/L):	1,486.610	Hardness as CaCO3:	825.710	T.P. Hydrocarbons (µg/L):	NR
Field Conductivity (µmhos):	1756	Field Alkalinity as CaCO3 (mg/L):	208	PCP (µg/L):	NR
Lab Conductivity (µmhos):	1648	Alkalinity as CaCO3 (mg/L):	141.07	Phosphate, TD (mg/L as P):	0.204
Field pH:	6.68	Ryznar Stability Index:	6.892	Field Nitrate (mg/L):	0.000
Lab pH:	6.84	Sodium Adsorption Ratio:	0.924	Field Dissolved O2 (mg/L):	NR
Water Temp (°C):	8	Langlier Saturation Index:	-0.026	Field Chloride (mg/L):	NR
Air Temp (°C):	NR	Nitrite (mg/L as N):	NR	Field Redox (mV):	NR
Nitrate + Nitrite (mg/L as N)	NR	Hydroxide (mg/L as OH):	NR	Lab, Dissolved Organic Carbon (mg/L):	NR
Total Kjeldahl Nitrogen (mg/L as N)	NR	Lab, Dissolved Inorganic Carbon (mg/L):	NR	Lab, Total Organic Carbon (mg/L):	NR
Total Nitrogen (mg/L as N)	NR	Acidity to 4.5	NR	Acidity to 8.3	NR
As(III) (ug/L)	NR	As(V) (ug/L)	NR		

Notes

Sample Condition:

Field Remarks:

Lab Remarks:

Explanation: **mg/L** = milligrams per Liter; **µg/L** = micrograms per Liter; **ft** = feet; **NR** = No Reading in GWIC

Qualifiers: **A** = Hydride atomic absorption; **E** = Estimated due to interference; **H** = Exceeded holding time; **J** = Estimated quantity above detection limit but below reporting limit; **K** = Na+K combined; **N** = Spiked sample recovery not within control limits; **P** = Preserved sample; **S** = Method of standard additions; **U** = Undetected quantity below detection limit; * = Duplicate analysis not within control limits; ** = Sum of Dissolved Constituents is the sum of major cations (Na, Ca, K, Mg, Mn, Fe) and anions (HCO3, CO3, SO4, Cl, SiO2, NO3, F) in mg/L. Total Dissolved Solids is reported as equivalent weight of evaporation residue.

Ground-Water Information Center

Isotope Tracer Report

Site Name: PIERCE HOWARD

Report Date: 2/23/2012

Location Information

Sample Id/Site Id:	2002R0055 / 59354	Sample Date:	11/15/2001 12:35:00 PM
Location (TRS):	09N 11W 16 ABBA	Agency/Sampler:	MBMG / MGR
Latitude/Longitude:	46° 32' 26" N 112° 58' 59" W	Field Number:	59354
Datum:	NAD27	Lab Date:	2/10/2002
Altitude:	4700	Lab/Analyst:	MBMG / JMC
County/State:	POWELL / MT	Sample Method/Handling:	/
Site Type:	WELL	Procedure Type:	DISSOLVED
Geology:	217SDMS	Total Depth (ft):	60
USGS 7.5' Quad:	GRIFFIN CREEK	SWL-MP (ft):	19.26
PWS Id:		Depth Water Enters (ft):	50
Project:	GWCP05		

Radon (Rn222 - pC/L):	750.000	Argon (Ar39):	NR
Carbon (C13):	NR	Silicon (Si32):	NR
Carbon (C14):	NR	Chlorine (Cl36):	NR
Tritium (H3 - TU):	NR	Lithium (Li6):	NR
H3/He3 Ratio:	NR	Krypton (Kr85):	NR
Deuterium (H2):	NR	Boron (B11)	NR
Oxygen (O18):	NR	Strontium (Sr87)	NR
Sulphur (S34):	NR	Chloro-fluorocarbon (CFC-11):	NR
Iodine (I129):	NR	Chloro-fluorocarbon (CFC-12):	NR
Nitrogen (N15):	NR	Chloro-fluorocarbon (CFC-113):	NR
Nitrogen (N15 of Nitrate):	NR	Oxygen (O18 of Nitrate):	NR
Sulphur (S34 of Sulfate):	NR	Oxygen (O18 of Sulfate):	NR

Notes

Sample Condition:

Field Remarks:

Lab Remarks:

Explanation: **pC/L** = picocuries per Liter; **TU** = Tritium Units; **NR** = No Reading in GWIC

Appendix C. SOIL SURVEY DATA

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Powell County Area, Montana

41C—Perma gravelly loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,000 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Perma and similar soils: 85 percent
Minor components: 15 percent

Description of Perma

Setting

Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Properties and qualities

Slope: 4 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 4e
Ecological site: Silty (Si) 15-19" p.z. (R044XW184MT)

Typical profile

0 to 10 inches: Gravelly loam
10 to 32 inches: Very gravelly loam
32 to 60 inches: Extremely gravelly sandy loam

Minor Components

Perma, stony

Percent of map unit: 8 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XW184MT)

Roy

Percent of map unit: 7 percent
Landform: Alluvial fans, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XW184MT)

Data Source Information

Soil Survey Area: Powell County Area, Montana
Survey Area Data: Version 9, Jan 5, 2012

Powell County Area, Montana

41D—Perma gravelly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,000 feet
Mean annual precipitation: 15 to 19 inches
Mean annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Perma and similar soils: 85 percent
Minor components: 15 percent

Description of Perma

Setting

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability (nonirrigated): 4e
Ecological site: Silty (Si) 15-19" p.z. (R044XW184MT)

Typical profile

0 to 10 inches: Gravelly loam
10 to 32 inches: Very gravelly loam
32 to 60 inches: Extremely gravelly sandy loam

Minor Components

Perma, cobbly

Percent of map unit: 8 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XW184MT)

Roy

Percent of map unit: 7 percent

Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Silty (Si) 15-19" p.z. (R044XW184MT)

Data Source Information

Soil Survey Area: Powell County Area, Montana
Survey Area Data: Version 9, Jan 5, 2012

Powell County Area, Montana

95F—Yreka gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 4,000 to 6,500 feet
Mean annual precipitation: 18 to 25 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Yreka and similar soils: 85 percent
Minor components: 15 percent

Description of Yreka

Setting

Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium

Properties and qualities

Slope: 35 to 60 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.7 inches)

Interpretive groups

Land capability (nonirrigated): 7e
Other vegetative classification: Douglas-fir/rough fescue (PK230), Douglas-fir/snowberry-bluebunch wheatgrass phase (PK311)

Typical profile

0 to 2 inches: Slightly decomposed plant material
2 to 14 inches: Gravelly loam
14 to 20 inches: Gravelly loam
20 to 60 inches: Very gravelly clay loam

Minor Components

Winkler

Percent of map unit: 4 percent
Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear

Rock outcrop

Percent of map unit: 3 percent

Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear

Sharrott
Percent of map unit: 3 percent
Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear

Crow
Percent of map unit: 3 percent
Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear

Rubble land
Percent of map unit: 2 percent
Landform: Mountains
Down-slope shape: Linear
Across-slope shape: Linear

Data Source Information

Soil Survey Area: Powell County Area, Montana
Survey Area Data: Version 9, Jan 5, 2012

Powell County Area, Montana

99E—Bignell gravelly clay loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 4,000 to 6,500 feet
Mean annual precipitation: 18 to 26 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Bignell and similar soils: 85 percent
Minor components: 15 percent

Description of Bignell

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.1 inches)

Interpretive groups

Land capability (nonirrigated): 6e
Other vegetative classification: Douglas-fir/snowberry-bluebunch wheatgrass phase (PK311)

Typical profile

0 to 2 inches: Slightly decomposed plant material
2 to 15 inches: Gravelly clay loam
15 to 60 inches: Very gravelly clay

Minor Components

Crow

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear

Yreka

Percent of map unit: 4 percent
Landform: Hills

Down-slope shape: Linear
Across-slope shape: Linear

Rock outcrop
Percent of map unit: 3 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear

Sharrott
Percent of map unit: 3 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear

Data Source Information

Soil Survey Area: Powell County Area, Montana
Survey Area Data: Version 9, Jan 5, 2012

Powell County Area, Montana

199E—Bignell gravelly clay loam, cool, 15 to 35 percent slopes

Map Unit Setting

Elevation: 4,000 to 6,500 feet
Mean annual precipitation: 18 to 26 inches
Mean annual air temperature: 37 to 45 degrees F
Frost-free period: 70 to 90 days

Map Unit Composition

Bignell and similar soils: 85 percent
Minor components: 15 percent

Description of Bignell

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Colluvium

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 5.1 inches)

Interpretive groups

Land capability (nonirrigated): 6e
Other vegetative classification: Douglas-fir/twinflower (PK290), Douglas-fir/snowberry (PK310)

Typical profile

0 to 2 inches: Slightly decomposed plant material
2 to 15 inches: Gravelly clay loam
15 to 60 inches: Very gravelly clay

Minor Components

Yreka

Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear

Rock outcrop

Percent of map unit: 5 percent
Landform: Hills

Down-slope shape: Linear
Across-slope shape: Linear

Hoyt
Percent of map unit: 5 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear

Data Source Information

Soil Survey Area: Powell County Area, Montana
Survey Area Data: Version 9, Jan 5, 2012

Appendix D. VEGETATION MANAGEMENT PLAN

Powel County Weed Board
422 Fairgrounds Rd
Deer Lodge, MT 59722
406-846-3348

Coordinator: Karen Laitala

Vegetation Management Plan

Landowner Name: _____

Landowner Address: _____

Property Legal Description: ____¼, ____¼, Sec._____, Town._____, Range_____

____¼, ____¼, Sec._____, Town._____, Range_____

Goals of the Landowner/Lessee's Proposed Weed Management Plan

The general goals of a Weed Management Plan are to prevent the spread of noxious weeds by eradicating any existing weeds and preventing further infestation. Please provide specific goals below.

1. Possible Noxious Weeds at the Site

☐ Spotted Knapweed	☐ Leafy Spurge	☐ Whitetop (Hoary Cress)
☐ Yellow Toadflax	☐ Perennial pepperweed	☐ Canada Thistle
☐ Houndstongue	☐ Dalmatian toadflax	☐ Other: _____
☐ Other: _____	☐ Other: _____	☐ Other: _____

2. Prevention of Infestation

Examples Include: Eradication of new invaders; Re-seeding of disturbed sites; Identification of weed seed transportation mechanisms on your property--waterways, vehicles, machinery, utility easement activities,

recreationalists, wildlife, livestock, contractors, public or private roads, hay feeding areas; Knowing what weeds are in the hay you purchase, etc.

Specific Control Measures (Check all that apply and explain):

☐ Irrigation _____

☐ Seeding by: ☒ Broadcasting, ☐ Drilling, or ☐ Hydroseeding

☐ Mechanical/Mowing

☐ Bio-control _____

☐ Hand Pulling _____

☐ Grazing (Sheep, etc.) _____

☐ Re-Vegetation

☐ Herbicide:

Weed in Question:	*Proposed Herbicide(s):*	*Application Rate:*
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
☐ Other _____	_____	_____

3. Mapping/Evaluation (Please provide a Map or Sketch of the Site Showing Noxious Weed Locations):

4. Please describe current weed infestations (if any):

5. Please be specific in who will be performing the work, and describe their qualifications:

6. When will the work be done?

7. Additional remarks:

Procedure in Cases of Non-Compliance

In Accordance with MCA 7-22-2123 *A person or entity is considered to be in compliance if the District accepts a Proposal to undertake specified weed control measures and remains in compliance as long as the person/entity performs according to the terms of the Proposal. If the Powell County Weed District has reason to believe—or has observed—that noxious weeds are present upon a site within the County, the District (or its authorized agent) may enter and inspect the land in question.*

If weeds are found, and the person/entity has not voluntarily complied with the District Weed Management Program's recommendations within 10 days of notification, the person/entity is considered to be in non-compliance and is subject to appropriate control measures pursuant to MCA 7-22-2124. These measures may include a fine and eradication of the weeds by the District at the person/entity's cost.

Execution of this Weed Management Plan constitutes acknowledgement of State Law and grants the District full authority relating to the enforcement thereof. By signing this document, the Operator agrees to submit a report three (3) years from the approval date detailing the effectiveness of the Weed Management Plan and the presence and species of weed (if any).

Landowner/Land Manager Signature: _____

Date: _____

Weed Board Chairperson Signature: _____

Date: _____